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Originals

A Taxonomic Study of the Genus *Campylotropis* (Leguminosae) I

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A taxonomic study of the genus *Campylotropis* was carried out on the basis of critical examination of all the species and infraspecific taxa so far recorded. Although 78 species and 12 infraspecific taxa have been known in the genus, 37 species and 12 infraspecific taxa are recognized as distinct taxa in this work. Twenty-nine names are newly treated as synonyms for the valid taxa, and 11 new names (seven new combinations and four new status) are proposed. A key to all the taxa recognized is given. Each taxon is enumerated with its original reference, selected bibliography, synonyms, a morphological description, a photo of herbarium specimen, and a drawing of flower and sometimes fruit. Distribution of each taxon is shown by a dotted map according to localities of the specimens examined. This paper is divided into three parts for publication. This first part contains introduction, description of morphological characters, chromosome numbers and pollen grains, a key to the species, and an enumeration of the species from No. 1 to No. 12. Two new combinations are proposed in this part. The references cited in this paper will be listed in the part three.

Key words: *Campylotropis*, classification, distribution, Leguminosae.

Introduction

Campylotropis Bunge (1835) belongs to the subtribe Lespedezinae of the tribe Desmodieae in the subfamily Papilionoideae (Ohashi et al. 1981). The genus is distinguished from *Lespedeza* by the falcate acute-keel petal, a single flower per bract on the inflorescence, pump mechanism for pollination and in also recently by the absence of both a floral nectary and fenestrae at the base of the staminal tube (Nemoto et al. 1995). The genus is widely distributed in temperate Asia from Pakistan, through the Himalayas and China to Korea and to Java and Taiwan. Most of the species are found in southwest China, especially Yunnan. *Campylotropis macrocarpa* (Bunge) Rehder (= *C. chinensis* Bunge), the type species (Fig. 1), has the widest distribution in the genus, being found in China, Korea and southern Mongolia.

Since its initial publication in 1835 *Campylotropis* was adopted only by Miquel (1855) prior to Schindler (1912). Most of its species had long been accomodated in *Lespedeza* (Bentham 1865), usually as a subgenus (Maximowicz 1873, Baker 1876) or a section (Taubert 1894). Schindler (1912, 1926, 1928) transferred these *Lespedeza* into *Campylotropis* and found many new species between 1912 and 1926. His final contribution to the genus was published in 1928. Ricker (1946) added a further 12 new species of which 11 were from China. Ohashi (1974a, 1974b, 1974c, 1976, 1979) revised Himalayan and Myanmarese (Burmese) species. Fu (1987) compiled the Chinese taxa

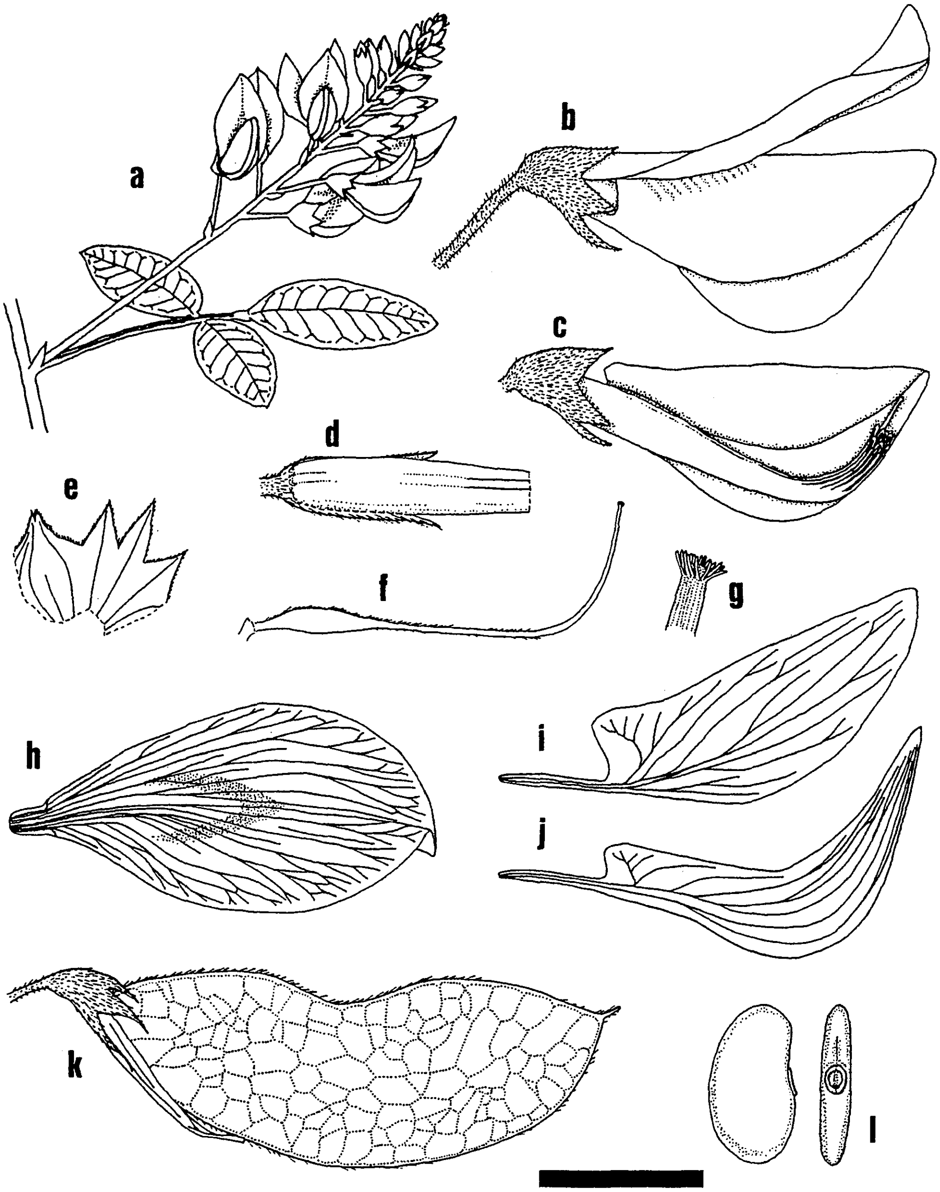

Fig. 1. *Campylotropis macrocarpa* (Bunge) Rehder var. *macrocarpa* f. *macrocarpa*. a: inflorescence, b: flower, c: flower removed standard and each one wing and keel-petal, d: base of staminal tube (view from ventral side), e: calyx dissected and opened, upper lobe in left (from inside), f: pistil, g: stigma, h: standard, i: wing, j: keel-petal, k: pod, l: seed. Voucher specimens: Iokawa 5388 TUS (inflorescence and flower) and Wilson 766 E (pod and seed). Scale bar = 5 mm (25 mm for a, 3.5 mm for d, 0.35 mm for g).

then known, but Chen (1988) added further new species for China. The most recent treatment for the Chinese species was made by Fu (1995) in the volume 41 of Flora Reipublicae Popularis Sinicae, but is followed his previous work. So far a total of 78 species and 12 infraspecific taxa have been recorded in the genus. However, no taxonomic system for the genus has yet been produced. This paper intends to clarify nomenclature, classification and distribution of the taxa so far recorded in the genus as a precursory work for further systematic studies. No infrageneric system for *Campylotropis* is proposed, but a system is in preparation by combining morphological characters and the results of molecular analysis.

This work is based on a critical comparison of vegetative structures, flowers and fruits of all described taxa of *Campylotropis*. Specimens kept in the following herbaria were examined: A, BM, BO, CAL, E, GH, K, KYO, KUN, NY, L, LE, P, PE, TAI, TI, and TUS. Pollen grains were obtained from herbarium specimens kept in A, E and K.

Morphological characters

1) Habit

Most of the species of *Campylotropis* are shrubs or shrublets with perennial aerial stems, but *C. hirtella* has annual aerial stems arising from axillary or adventitious buds near the base of the old stems. The habit of *C. hirtella* is easily recognized in the field by the remaining withered shoots from previous years at the base of new annual shoots. *Campylotropis alopochroa*, *C. falconeri* and *C. yunnanensis* show a similar habit to *C. hirtella*. Species of *Lespedeza* are shrubs, shrublets or perennial herbs, while those of *Kummerowia* are annual herbs.

2) Leaves

The leaves of *Campylotropis* are pinnately trifoliolate as those of *Kummerowia* and *Lespedeza*. The rachis is conspicuous except in *C. brevifolia* and *C. wilsonii*, which appear to have palmately trifoliolate leaves, but their leaves are also pinnately trifoliolate. This feature of the leaves in both species is similar to that of *Kummerowia*, which are also seemingly palmately trifoliolate (Iokawa et al. 1996).

Stipels of *Campylotropis* are recognized

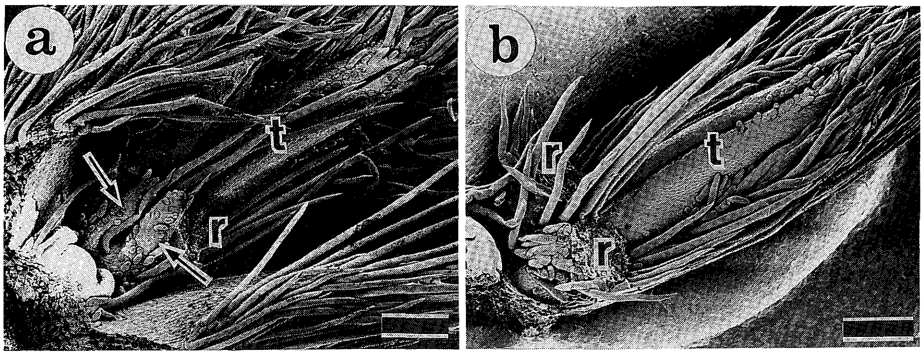

Fig. 2. Leaf enclosed in bud showing a pair of primordia of stipel (arrows) in *Campylotropis polyantha* var. *polyantha* f. *polyantha* (a), but not in *C. macrocarpa* var. *macrocarpa* f. *macrocarpa* (b). r: remnant of lateral leaflets, t: terminal leaflet. Scale bars = 100 μm. Voucher specimens: Iokawa 5384 TUS (a) and Iokawa 5288 TUS (b).

as being usually absent, but sometimes present (Hutchinson 1964) or present but caducous (Fu 1987). *Lespedeza* and *Kummerowia* are exstipellate. We confirmed that most of the species of *Campylotropis* lack stipels even in the early developmental stages of the leaves (Fig. 2). Only *C. polyantha* and *C. yunnanensis* usually have stipels except on the cotyledons. Stipels are rarely found on some leaves in *C. argentea*, *C. bonii*, *C. macrocarpa* and *C. trigonoclada*, although most of their leaves are exstipellate.

Campylotropis diversifolia has dimorphic leaves, i. e., the leaflets of lower leaves are obovate, while those of the upper ones are deltoid, and the petiole is very short in the upper leaves. In *C. harmsii*, the leaflets of lower leaves are usually obovate, while those of upper leaves are usually elliptic but sometimes orbicular or transverse elliptic, and the leaves are sometimes nearly sessile in the upper parts of the plant.

The leaflets of *Campylotropis* are usually elliptic, oblong or obovate, but deltoid in *C. hirtella* and obdeltoid in *C. bonii, C. macrostyla, C. stenocarpa* and *C. wilsonii*. The upper surface of the leaflets is glabrous, but *C. argentea, C. brevifolia* and *C. pinetorum* have dense, minute, patent hairs. The lower surface of the leaflets are variously hairy, e.g. dense, whitish, silky hairs in *C. argentea* and *C. thomsonii*; dense, yellowish, soft hairs in *C. pinetorum* and *C. delavayi* and sparse, appressed, short hairs in *C. capillipes* and *C. yunnanensis*.

We use the terms for description of simple symmetrical plane shapes proposed by The Systematics Association Committee for descriptive Biological Terminology (1962) cited in Stearn (1992).

3) Glandular hairs

Previously, glandular hairs were known in only two species in *Campylotropis*, *C. decora* as *Lespedeza decora* (Kurz 1873) and *C. wangii* (Ricker 1946; *C. polyantha* in this paper), but their details were unknown. We found glandular hairs to be present in 22 species, including the above two, but absent in 15 species. The glandular hairs were generally present on the calyx, pedicels and main inflorescence axes. They are stalked, bulbous, 0.1–0.7 mm long and with an elongated neck (Figs. 3 and 4), appearing similar to those of *Lespedeza* (Iokawa et al. in prep.). Such hairs are also known in the tribe Desmodieae from *Desmodium* (Schubert 1950), *Uraria* (Dy Phon 1987) and a species of *Lespedeza* (Nemoto and Ohashi 1999) as well as several genera of the tribe Phaseoleae (Lackey 1981). Lackey (1981) pointed out the taxonomic significance of glandular hairs in tribe Phaseoleae because of their exclusive presence in the subtribe Cajaninae. The taxonomic evaluation of the glandular hairs in *Campylotropis* and *Lespedeza* needs further study (Iokawa et al. in prep.).

The glandular hairs are similar in structure among all species of *Campylotropis* and *Lespedeza* examined. They are basically composed of three parts, that is, stalk, bulbous part and elongated neck. The stalk is uniseriate and comprises one or two discoid cells (Figs. 3, 4a, 4c). The bulbous part of the hair is composed of three or four cell layers (Fig. 4a) and each layer comprises four to eight cells in *C. macrocarpa* and *C. polyantha* (Fig. 4d, 4e), and four to 16 cells in *C. pinetorum* (Fig. 4f). Above the bulbous part, eight to 12 pairs of semicylindrical cells (Fig. 4g) pile up and form the biseriate neck (Fig. 4b).

4) Inflorescence

One of the important characters for distinguishing *Campylotropis* from *Lespedeza* was the number of flowers per bract; one in *Campylotropis* and two in *Lespedeza* (Bunge 1835). The inflorescence of *Campylotropis*, therefore, has been recognized as a raceme while that of *Lespedeza* is a pseudoraceme

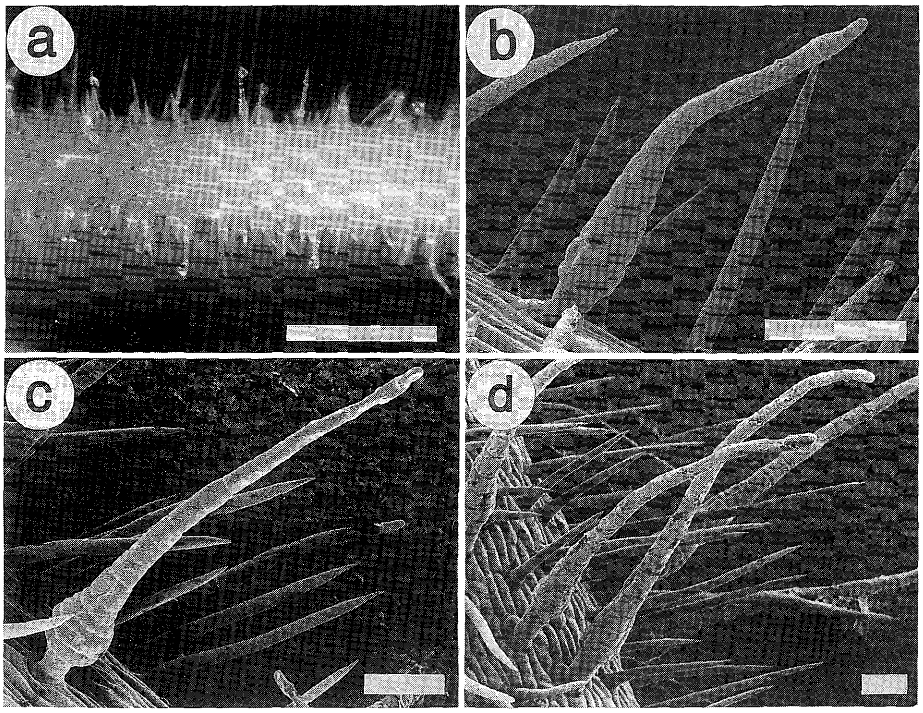

Fig. 3. Glandular hairs on pedicel in *Campylotropis*. a, b: *C. macrocarpa* var. *macrocarpa* f. *macrocarpa* (voucher specimen: Iokawa 5388 TUS), c: *C. polyantha* var. *polyantha* f. *polyantha* (Iokawa 5284, TUS), d: *C. pinetorum* subsp. *pinetorum* (Iokawa 5391, TUS). Scale bars = 500 μm (a) and 50 μm (b, c, d).

(Nemoto et al. 1995). Nemoto and Ohashi (1996), however, revealed that the raceme of *Campylotropis* is reduced from a pseudoraceme, because of the presence of an additional phyllome at the base of the pedicel in *C. hirtella* and *C. giraldii* (= *C. macrocarpa* var. *hupehensis* in this paper). The phyllome was recognized to be a prophyll on a reduced lateral branch borne in the axil of bract. *Campylotropis hirtella* has the distinct apex of the reduced lateral branch in earlier developmental stages of the inflorescence (Nemoto and Ohashi 1996). These additional phyllomes were also found in 19 other species and thus occurs rather commonly in the genus, although the frequency of the presence in each species was less than in *C. hirtella*. The inflorescence features displayed by *C. hirtella* are regarded to be more primitive than those in species without, or only rarely showing, an additional phyllome (Nemoto and Ohashi 1996).

Several species including *Campylotropis alopochroa*, *C. delavayi*, and *C. hirtella* appear to have a terminal panicle. The panicle is constructed by reduction of the leaves subtending several racemes in the upper part of plant. Even in such cases, stipules usually remain at the base of each raceme. *Campylotropis alba* and *C. macrostyla* have umbel-like inflorescences with reduced axes, and *C. teretiracemosa* has spike-like ones with reduced pedicels.

Fu (1987) classified the Chinese species into three groups based on persistence of the bracts. Most of the bracts in *C. capillipes* and

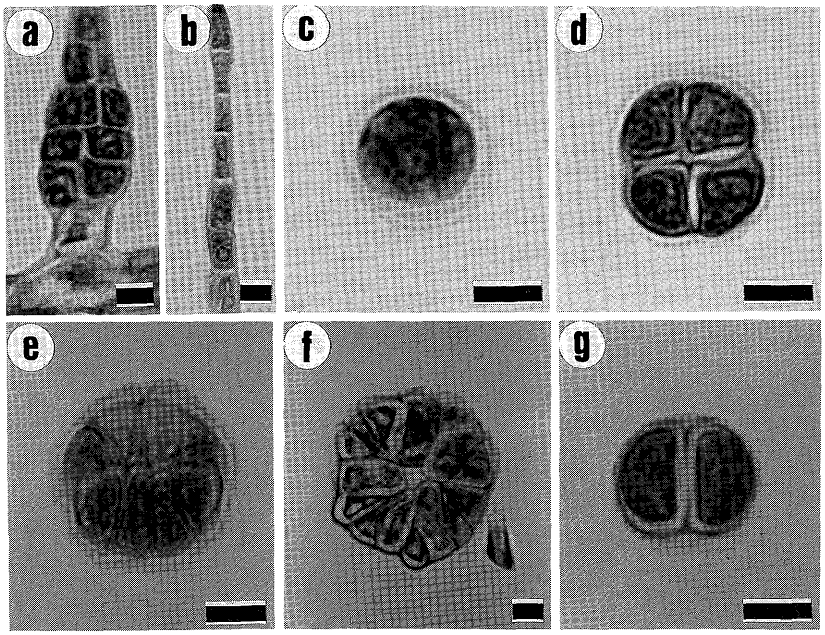

Fig. 4. Sections of glandular hairs of *Campylotropis macrocarpa* var. *macrocarpa* f. *macrocarpa* (a, b, c, d, g; voucher specimen: Iokawa 5388, TUS), *C. polyantha* var. *polyantha* f. *polyantha* (e; Iokawa 5284, TUS) and *C. pinetorum* subsp. *pinetorum* (f; Iokawa 5391, TUS). a: Longitudinal section of the stalked bulbous part. b: Longitudinal section of the biseriate neck. c: Transverse sections of the stalk. d, e, f: Transverse sections of the bulbous part. g: Transverse sections of biseriate neck. Scale bars = 10 μm.

C. trigonoclada are persistent and those in *C. macrocarpa* and *C. polyantha* are caducous, but the persistence of bracts is not stable and varies even within a species as mentioned by Fu (1987). This characteristic shows no correlation with other characteristics, and we could not confirm his groupings.

5) Calyx

The calyx of *Campylotropis* is campanulate and 5-lobed of which the adaxial two are united to form an upper lobe and hence is usually described as 4-lobed. The outer surface of the calyx is always hairy but variably so, e.g., densely whitish-pilose in *C. alba*, *C. brevifolia*, *C. macrostyla* and *C. stenocarpa*, densely yellowish-villose in *C. pinetorum* and *C. sulcata* and sparsely appressed short hairy in *C. capillipes*, *C. diversifolia*, *C. yunnanensis* and *C. wilsonii*. The inner surface is glabrous. The calyx lobes are usually more than 2 times longer than the tube in *C. alba*, *C. delavayi*, *C. macrostyla*, *C. pinetorum* and *C. stenocarpa*, while those of other species are nearly equal to the length of tube or, even if longer, shorter than 2 times the length of tube. The upper lobe is minutely 2-toothed at the apex, and the lowest lobe is not always longer than others.

6) Corolla

The corolla of *Campylotropis* is similar to those of *Lespedeza* and *Kummerowia*, but different in the shape of the keel petals. Bunge (1835) regarded the keel petals to be a symbolic character of the genus, and named it *Campylotropis*, which means "incurved keel" in Greek. The keel-petals are narrowly oblong, inflexed usually at about a right angle near the middle of lamina, acute at the apex and slightly auriculate at the base with a slender claw, while those of *Lespedeza* and *Kummerowia* are obovate or oblong, almost straight or slightly inflexed and obtuse at the apex. Fu (1987) used the shape of keel-petal as a character for classification of the Chinese species. However, the shape is not constant even within an individual as shown in *Campylotropis polyantha* and within a species as shown in *C. macrocarpa* var. *hupehensis* (Fig. 5). We did not use, therefore, the keel shape as a diagnostic character for our classification.

The lamina of the standard is broadly obovate, obovate or elliptic with a pair of minute auricles at the base and attenuate towards the short claw. The lamina of the wings are obliquely oblong with a distinct auricle at the adaxial base and a slender claw. Color of the corolla varies from violet to pale pink or pinkish white, deeper toward the apex, but, exceptionally, *C. trigonoclada* var. *trigonoclada* has yellow corollae. A white flowered variation is rarely known in *C. macrocarpa*. The standard has a pair of greenish nectar guides for insects at the base of recurved part of the lamina. The corollae of *Campylotropis* are usually 10–14 mm long, but less than 9 mm long in *C. argentea, C. cytisoides* and *C. teretiracemosa.*

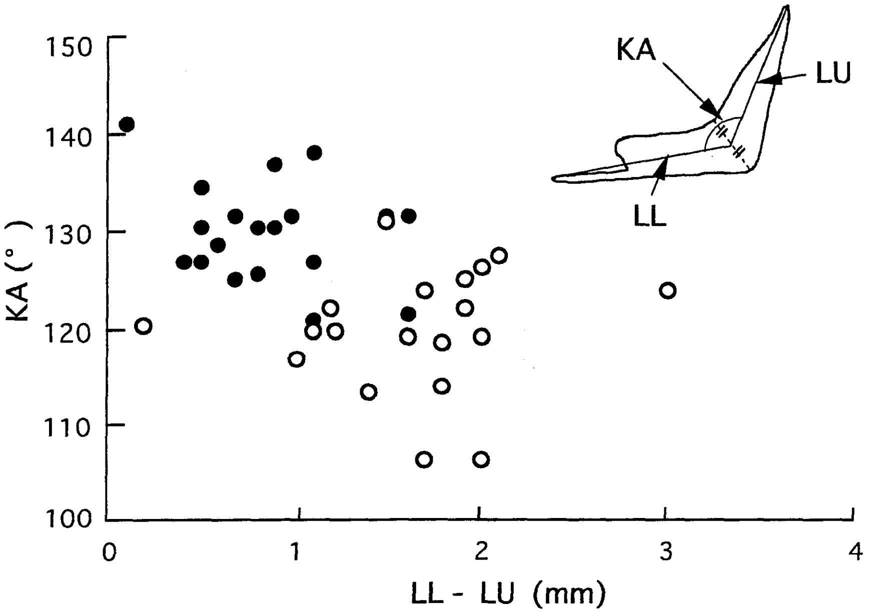

Fig. 5. Variation in incurved angle of keel-petal in flowers from one individual of *Campylotropis polyantha* var. *polyantha* f. *polyantha* (●), cultivated in the Biological Institute, Tohoku University (voucher specimen: Iokawa 5284, TUS), and among flowers from specimens of *C. macrocarpa* var. *hupehensis* (○), collected in Hualien Co., Taiwan (vouchers are indicated with an asterisk in the specimens examined in the text). KA: keel-petal angle, LL: length from base of claw to inflexed point at about the middle of lamina, LU: length from this point to apex of keel-petal, LL–LU: difference between LL and LU.

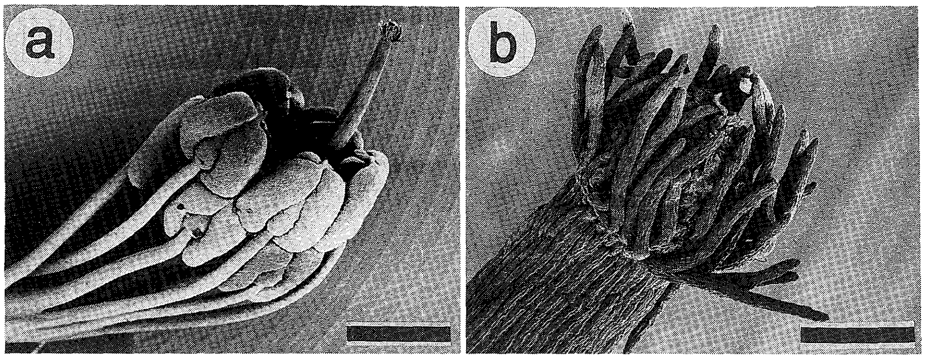

Fig. 6. a: Anthers and upper part of pistil of *Campylotropis macrocarpa* var. *macrocarpa* f. *macrocarpa* showing their relative position before anthesis. b: stigma. Scale bars = 500 μm (a) and 50 μm (b). Voucher specimen: Iokawa 5388 TUS.

7) Androecium

The androecium of *Campylotropis* is monadelphous; one vexillary (adaxial) stamen is connate to the staminal tube at the base for one-sixth to one-third of its length, although it is almost free in *C. burmanica* and *C. cytisoides*. The remaining nine fuse into a staminal tube, in which the filaments connate for two-thirds to four-fifths of the length. There are no fenestrae on the fused staminal tube in *Campylotropis*, but *Lespedeza* and *Kummerowia* have a pair of fenestrae at each side of the base of the vexillary filament (Nemoto et al. 1995). The androecium fenestrae are correlated with discoid floral nectaries that are absent in *Campylotropis* but present in *Lespedeza* and *Kummerowia* (Nemoto et al. 1995).

8) Pistil

The ovary has only one ovule, which is one of the remarkable characters of Lespedezinae (Ohashi et al. 1981). It is laterally flattened and narrowly ovate with a short stipe. The style of *Campylotropis* is long, filiform and incurves almost at a right angle, corresponding to the shape of the staminal tube, while that of *Lespedeza* and *Kummerowia* is only slightly arcuate. The stigma in *Campylotropis* is terminal and surrounded by minute hairs (Fig. 6).

9) Fruits and seeds

The fruit of *Campylotropis* is a 1-seeded indehiscent article, as is that of *Lespedeza* and *Kummerowia* (Ohashi et al. 1981). Fruits are laterally flattened, obliquely oblong or obovate and shortly stipitate at the base. In most species fruits are 10–12 mm long, 6–8 mm wide, with a mucronate apex. In *C. macrostyla* and *C. stenocarpa*, the whole style remains at the apex of the fruit and, especially in the latter, hardens into a hook. *Campylotropis griffithii* and *C. stenocarpa* have larger fruits than the others, 15–20 mm long. The margin and lateral surface of the fruits are usually covered with short hairs, but are glabrous and conspicuously reticulate-veined in *C. griffithii, C. macrocarpa* var. *macrocarpa*, *C. polyantha* var. *polyantha* f. *leiocarpa* and *C. yunnanensis.*

The seeds are reniform to transversely elliptic, reddish-brown to purplish-black and rim-arillate with a ring-like margin around the hilum.

Chromosome numbers

The chromosomes of *Campylotropis* was

Table 1. Pollen grains of *Campylotropis*

Species	Polar length (μm)			Equatorial length (μm)			P/E	Tectum-pattern	Voucher specimen
	(min–)	Mean	(–max)	(min–)	Mean	(–max)			
C. argentea	(22.1–)	23.3	(–26.0)	(19.6–)	20.7	(–21.9)	1.13	reticulate	Henry 10384 (E)
C. brevifolia	(25.5–)	25.9	(–26.2)	(20.6–)	20.9	(–21.9)	1.24	reticulate	Handel-Mazzetti 5604 (A)
C. capillipes	(25.1–)	26.1	(–26.8)	(20.2–)	21.5	(–22.1)	1.21	reticulate	Forrest 23162 (E)
C. cytisoides	(23.4–)	25.0	(–26.2)	(19.6–)	20.8	(–21.9)	1.20	reticulate	Henry 12712 (E)
C. decora	(23.8–)	25.1	(–26.0)	(19.6–)	20.5	(–21.1)	1.22	reticulate	Watt 10722 (E)
C. delavayi	(24.9–)	26.0	(–27.2)	(20.6–)	21.2	(–22.8)	1.23	reticulate	Forrest 15474 (E)
C. diversifolia	(24.9–)	25.7	(–27.0)	(20.9–)	22.6	(–23.4)	1.14	reticulate	Henry 9243A (E)
C. falconeri	(25.7–)	26.6	(–27.7)	(19.6–)	20.4	(–21.3)	1.30	reticulate	Watt 24/9/87 (E)
C. grandifolia	(22.6–)	24.0	(–25.5)	(18.9–)	20.6	(–22.1)	1.17	reticulate	Henry 9890 (A)
C. griffithii	(24.9–)	25.7	(–27.2)	(19.1–)	20.4	(–21.3)	1.26	reticulate	Hara & al. 4416 (E)
C. hirtella	(26.8–)	28.2	(–29.8)	(21.3–)	22.1	(–24.3)	1.28	reticulate	Forrest 6140 (E)
C. howellii	(26.0–)	27.3	(–29.1)	(20.2–)	21.5	(–22.6)	1.27	reticulate	Howell 6 (E)
C. macrocarpa	(23.0–)	24.5	(–26.2)	(19.4–)	20.5	(–21.5)	1.20	reticulate	Hemeling 25 (E)
C. macrostyla	(21.9–)	23.7	(–25.5)	(18.7–)	20.1	(–23.4)	1.18	reticulate	Duttice 19793 (E)
C. pinetorum	(21.9–)	23.3	(–24.9)	(19.1–)	19.9	(–21.3)	1.17	reticulate	Cavalerie 3683 (E)
C. polyantha	(24.5–)	25.4	(–26.2)	(18.7–)	20.1	(–21.9)	1.26	reticulate	Cavalerie 3997 (E)
C. sargentiana	(23.0–)	24.3	(–25.7)	(15.1–)	16.5	(–17.0)	1.47	reticulate	Wilson 3492 (A)
C. speciosa	(26.6–)	27.4	(–27.9)	(21.1–)	21.5	(–22.3)	1.27	reticulate	Lace 1040 (E)
C. stenocarpa	(24.5–)	24.8	(–25.3)	(19.1–)	20.7	(–21.9)	1.20	reticulate	Lace 851 (E)
C. sulcata	(25.7–)	26.4	(–27.9)	(21.3–)	21.8	(–23.4)	1.21	reticulate	Forrest 18452 (E)
C. thomsonii	(21.3–)	23.2	(–24.8)	(18.1–)	20.0	(–21.4)	1.16	reticulate	Hooker & Thomson s.n. (K)
C. trigonoclada	(23.6–)	25.0	(–26.2)	(18.7–)	20.1	(–21.9)	1.24	reticulate	Bodinier 1820 (E)
C. wilsonii	(24.3–)	25.1	(–25.5)	(17.9–)	19.5	(–20.6)	1.29	reticulate	Wilson 3387 (A)
C. yunnanensis	(23.2–)	23.7	(–24.3)	(18.3–)	19.1	(–20.6)	1.24	reticulate	Forrest 11057 (E)

examined first by Pierce (1939) who reported 2n=22 for *C. macrocarpa* as *Lespedeza macrocarpa.* Subramanyam and Kamble in Löve (1967) reported n=11 for *C. thomsonii.* However, Mehra and Dhawan in Löve (1971) and Sandhu and Mann (1989 fide Goldblatt and Johnson 1991) reported n=9 for *C. eriocarpa* (=*C. speciosa* var. *eriocarpa* in this paper) as *L. eriocarpa. Campylotropis stenocarpa* as *L. stenocarpa* was recorded to have n=9 (Mehra and Dhawan 1971), but n=11 was reported by Singhal et al. in Löve (1980), Bir et al. (1980 fide Goldblatt 1988) and Gill et al. (1984 fide Goldblatt 1988). Larsen (1971) recorded 2n=20 for *C. parviflora* (=*C. cytisoides* f. *parviflora*) as *L. parviflora. Campylotropis polyantha* has 2n=22 chromosomes reported by Yeh et al. (1986 fide Goldblatt and Johnson 1990) and Gao et al. (1992). Recently, Gao et al. (1992) summarized previous records of the chromosome numbers of *Campylotropis* and recorded n=11 and/or 2n=22 for 10 Chinese species including new records from *C. argentea*, *C. bonatiana* (=*C. trigonoclada* subsp. *bonatiana*), *C. diversifolia*, *C. henryi*, *C. pinetorum* subsp. *velutina* (=*C. pinetorum* subsp. *velutina*), *C. polyantha* var. *leiocarpa* (=*C. polyantha* f. *leiocarpa*), *C. prainii* (=*C. capillipes* subsp. *prainii*) and *C. trigonoclada*, and only one aneuploid, 2n =22 and 23, was recorded in *C. polyantha* var. *leiocarpa.* These previous reports suggest that n=9 has been found in India and 2n =20 only in Thailand, but these numbers are not found in China, where all the species examined so far have n=11 and/or 2n=22. The basic numbers are, therefore, x=9, 10, and 11 in *Campylotropis* and the commonest is x= 11. In subtribe Lespedezinae, the basic number is x=9, 10, 11 in *Lespedeza* and x=11 in *Kummerowia.* The basic number x=9 may be

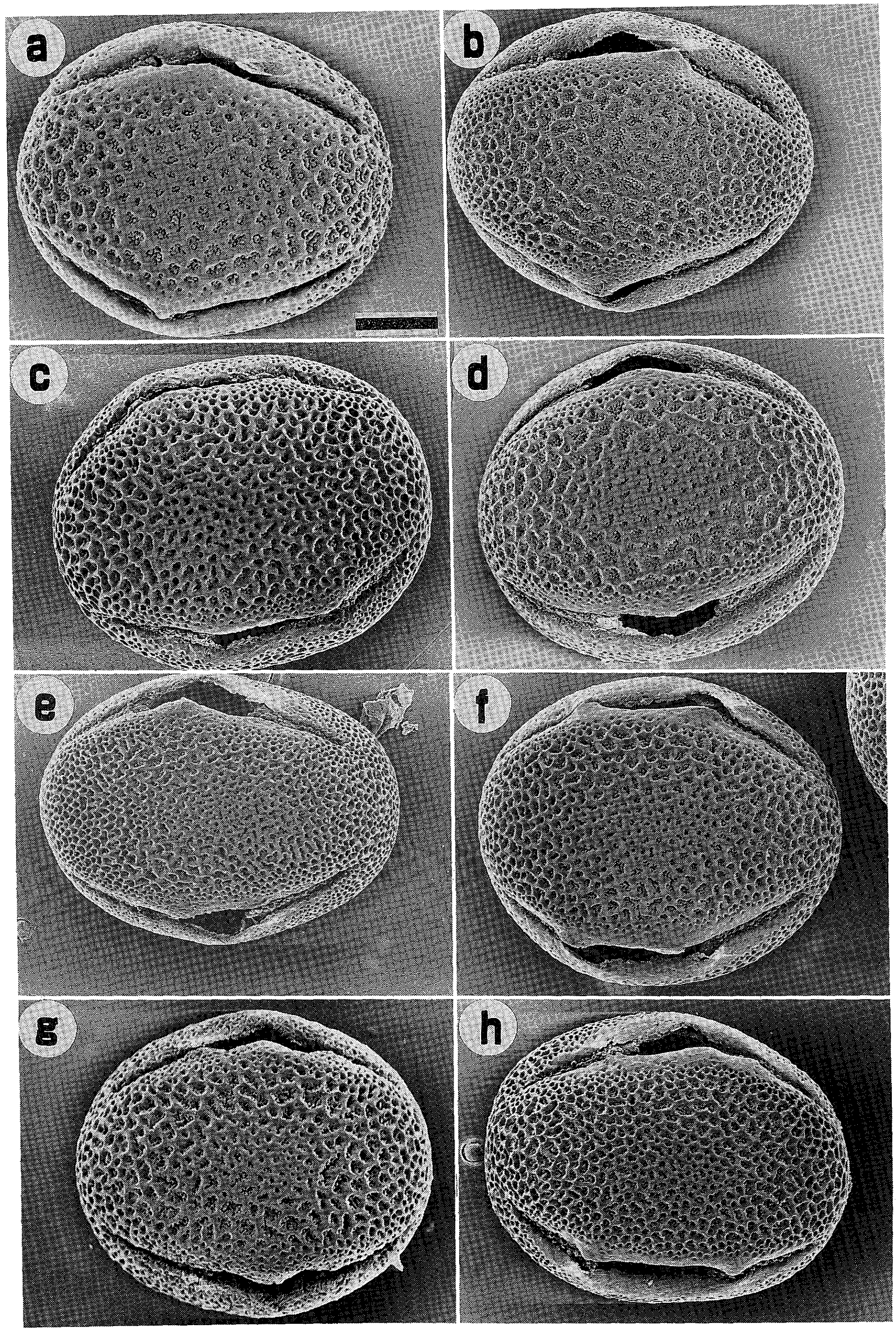

Fig. 7. Pollen grains of *Campylotropis* (I). a: *C. argentea* (voucher specimen: Henry 10384, E), b: *C. brevifolia* (Handel-Mazzetti 5604, A), c: *C. capillipes* subsp. *capillipes* (Forrest 23162, E), d: *C. cytisoides* f. *parviflora* (Henry 12712, E), e: *C. decora* (Watt 10722, E), f: *C. delavayi* (Forrest 15474, E), g: *C. diversifolia* (Henry 9243A, E), h: *C. falconeri* (Watt 24/9/87, E). Scale bar = 5 μm.

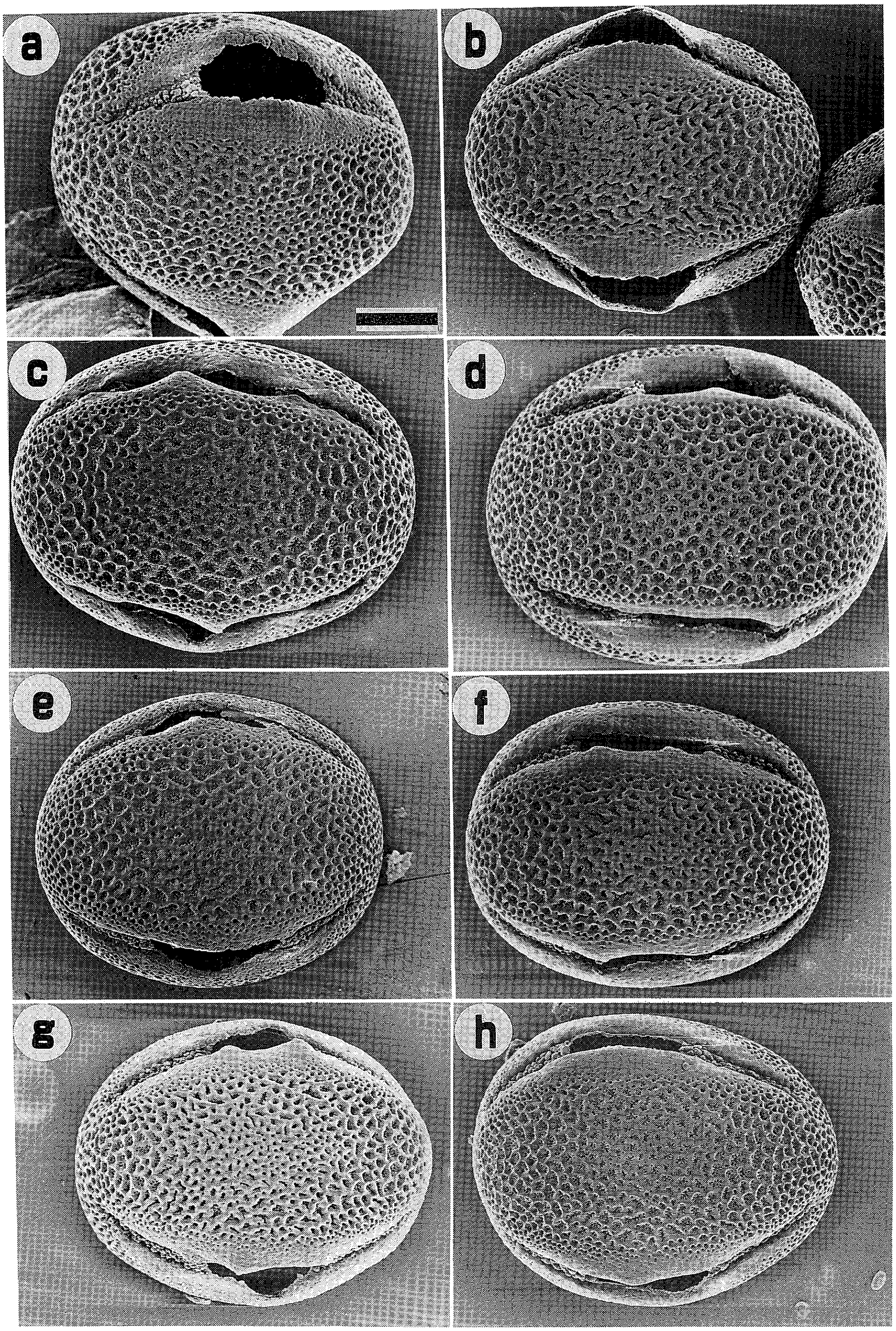

Fig. 8. Pollen grains of *Campylotropis* (II). a: *C. grandifolia* (voucher specimen: Henry 9890, A), b: *C. griffithii* (Hara et al., 4416 E), c: C. *hirtella* (Forrest 6140, E), d: C. *howellii* (Howell 6, E), e: *C. macrocarpa* var. *macrocarpa* f. *macrocarpa* (Hemeling 25, E), f: *C. macrostyla* (Duttice 19793, E), g: *C. pinetorum* subsp. *velutina* (Cavalerie 3683, E), h: *C. polyantha* var. *polyantha* f. *polyantha* (Cavalerie 3997, E). Scale bar = 5 μm.

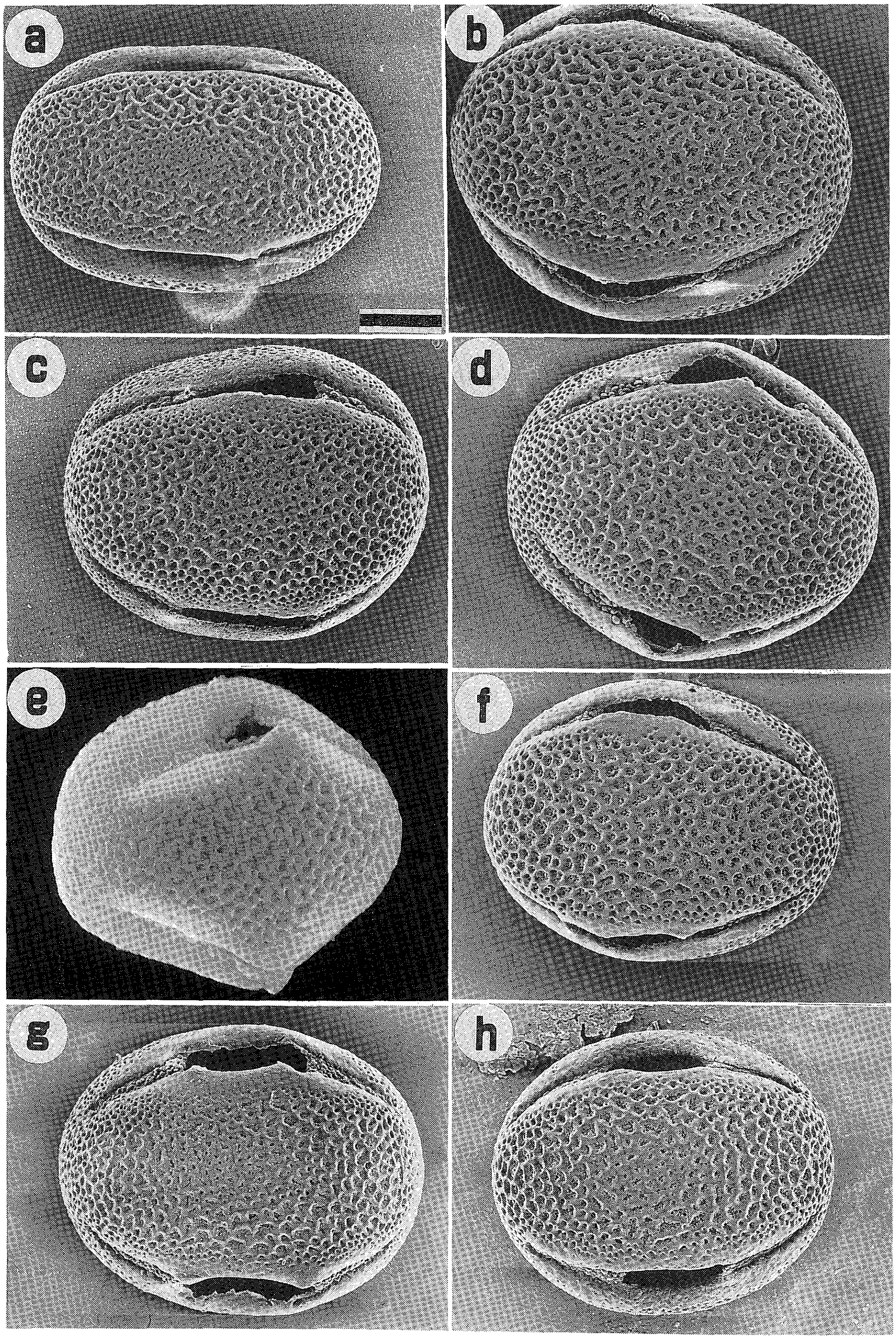

Fig. 9. Pollen grains of *Campylotropis* (III). a: *C. sargentiana* (voucher specimen: Wilson 3492, A), b: *C. speciosa* subsp. *speciosa* (Lace 1040, E), c: *C. stenocarpa* (Lace 851, E), d: *C. sulcata* (Forrest 18452, E), e: *C. thomsonii* subsp. *thomsonii* (Hooker & Thomson s.n., K), f: *C. trigonoclada* var. *trigonoclada* (Bodinier 1820, E), g: *C. wilsonii* (Wilson 3387, A), h: *C. yunnanensis* subsp. *yunnanensis* (Forrest 11057, E). Scale bar = 5 μm.

most primitive among the subtribe.

Pollen grains

The pollen morphology has so far been described for eight species in *Campylotropis*, i. e., *C. griffithii*, *C. macrocarpa*, *C. macrostyla*, *C. parviflora*, *C. pinetorum*, *C. prainii*, *C. stenocarpa*, and *C. thomsonii* (Ohashi 1971, Mitra and Mondal 1982). In the present study we observed the pollen of 24 species including the eight species above. A list of specimens used is given in Table 1.

The pollen grains were acetolysed following the standard method (Erdtman 1960) and dehydrated in an ethanol series. The samples were air dried and coated with gold palladium, and examined with a Hitachi S-4100 scanning electron microscope in the Biological Institute of Tohoku University. The polar and equatorial lengths were measured on 30 grains in each sample. Pollen terminology follows Punt et al. (1994).

The pollen grains are similar among all species examined and basically agree with the former descriptions. They are tricolporate, 23–28 × 17–23 μm in size, P/E = 1.1–1.5, prolate, subprolate or prolate spheroidal (Figs. 7–9). The colpi are marginate with a more or less jagged margin and granulated on the membrane. The pores are 6–8 μm in diameter. The exine is reticulate and the lumen size is 0.1–1.5 μm in diameter. Mitra and Mondal (1982) noted that the sculpturing of *Campylotropis parviflora* (= *C. cytisoides* var. *parviflora* in this paper) and *C. stenocarpa* is homobrochate, while that of *C. prainii* (= *C. capillipes* var. *prainii*) is heterobrochate. However, the lumen size decreases toward the colpus margin and often in the center of the mesocolpium in all species examined. *Campylotropis* is palynologically similar to *Lespedeza*, but the reticulation of *Campylotropis* is smaller than those of *Lespedeza* as pointed out by Ohashi (1971).

Taxonomic treatment

Campylotropis Bunge

Campylotropis Bunge, Zap. Izd. Kazansk. Univ. **4**: 157 (1835); Miq., Fl. Ned. Ind. **1**: 229 (1855); Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 338 et 424 (1912); Rehder, Man. Cult. Tr. Shr. 517 (1927); Hutchinson, Gen. Fl. Pl. **1**: 488 (1964); H.Ohashi in J. Jap. Bot. **49**: 40 (1974); H.Ohashi et al. in Polhill et Raven, Adv. Leg. Syst. **1**: 300 (1981); P.Y.Fu in Bull. Bot. Res., Harbin **7** (4): 22 (1987), et in Fl. Reip. Pop. Sin. **41**: 92 (1995). Type species : *C. chinensis* Bunge (= *C. macrocarpa* (Bunge) Rehder).

Phlebosprium Jungh., Reisen Durch Java 346 (1845); Hasskarl in Flora **30**: 508 (1847), ut *Phlebosporium*; Benth. & Hook. f., Gen. Pl. **1**: 524 (1865). Type species: *P. cytisoides* Jungh.

Oxyramphis Wall. [Cat. no. 5348 (1831), nom. nud.] ex Meisn. in Pl. Vasc. Gen. 84, 60 (1837); Lindl. in Bot. Reg. **32**, fig. 28 (1846). Type species: *O. macrostyla* (D.Don) Wall. ex Meisn. (*Crotalaria macrostyla* D.Don).

Lespedeza sect. Campylotropis (Bunge) Benth. in Hook., J. Bot. Kew Misc. **4**: 48 (1852), in nota; Taub. in Engl. & Prantl, Nat. Pflanzenfam. III, **3**: 332 (1894); Nakai, *Lespedeza* Japan & Korea 3 (1927).

Lespedeza subgen. Campylotropis (Bunge) Maxim. in Acta Hort. Petrop. **2**: 524 (1873).

Lespedeza subgen. Oxyramphis (Wall. ex Meisn.) Baker in Hook.f., Fl. Brit. Ind. **2**: 143 (1879).

Shrubs or shrublets. Stems slightly angular, hairy. Leaves pinnately 3-foliolate, stipulate, petiolate and distinctly pulvinate. Stipules 2, free, subcoriaceous or scariose, striate, usually narrowly triangular, rarely triangular or deltoid-ovate, acute to acuminate at the apex, abaxial surface densely or sparsely appressed hairy, adaxial surface glabrous. Petioles sulcate above, less densely hairy than the pulvinus. Leaflets chartaceous to coriaceous, entire, sessile but distinctly pulvinate; terminal leaflets larger than the lateral one. Stipels entirely to mostly absent, or rarely always present, linear. Inflorescences axillary, racemose, rarely umbellate or spicate, usually with 10–20 flowers per raceme, rarely less than eight or 20–30; terminal panicle comprised of several upper racemes with reduced subtending leaves. Flowers uniparous, pedicellate, bracteate at the base of the pedicels. Bracts narrowly ovate or ovate, rarely linear, acute at apex, abaxial surface pubescent or puberulent, adaxial surface glabrous, usually persistent at anthesis. Bracteoles 2 at the base of the calyx, linear, acute at the apex, pubescent on abaxial surface, glabrous on adaxial surface, usually caducous before anthesis. Calyx campanulate, distinctly 4-lobed, hairy on the outer surface, glabrous on the inner surface; upper lobe minutely 2-toothed at the apex, usually lowest lobe longer than the other lobes. Corolla violet to pinkish-white or rarely yellow; standard broadly obovate, obovate or elliptic, slightly retuse or rounded at the apex, attenuate to the short basal claw, minutely auriculate; wings obliquely oblong, obtuse at the apex, distinctly auriculate at the adaxial base, clawed; keel-petals narrowly oblong, inflexed usually at about a right angle near the middle of lamina, acute at the apex, auriculate at the adaxial base, clawed at the base. Androecia monadelphous, rarely almost diadelphous, staminal tube about two-thirds to four-fifths of their length, vexillary stamen connate to the staminal tube at the base in one-sixth to one-third of its length. Gynoecia minutely stipitate; ovary 1-ovuled, narrowly ovate, usually pubescent on the suture, sparsely short hairy on lateral surfaces; style filiform, incurved at nearly a right angle; stigma small, terminal, ciliate with minute hairs. Pods 1-seeded, indehiscent, minutely stipitate, flattened, oblique oblong or obovate, mucronate or rarely aristate at the apex, obtuse at the base, usually hairy but rarely glabrous on the lateral surface, hairy along the sutures. Seeds reniform or transversely elliptic, reddish-brown to purplish-black, rim-arillate with ring-like margin around the hilum.

List of *Campylotropis*

Following is the list of *Campylotropis* adopted as correct in our studies. We recognized 37 species including six subspecies, three varieties and three forms. The rank of subspecies is adopted for those infraspecific taxa different from the typical form in a few non-trivial morphological characters for the genus and separated in geographical distribution; that of variety is for infraspecific taxa distinct in a few morphological characters but continuous in geographical distribution; and that of form in a single trivial but distinct character.

1. *Campylotropis alba* Schindl. ex Iokawa & H.Ohashi
2. *C. alopochroa* H.Ohashi
3. *C. argentea* Schindl.
4. *C. bonii* Schindl.
5. *C. brevifolia* Ricker
6. *C. burmanica* H.Ohashi
7. *C. capillipes* (Franch.) Schindl.
    subsp. *capillipes*
    subsp. *prainii* (Coll. & Hemsl.) Iokawa & H.Ohashi
8. *C. cytisoides* Miq.
        f. *cytisoides*
        f. *parviflora* (Kurz) Iokawa & H. Ohashi
9. *C. decora* (Kurz) Schindl.
10. *C. delavayi* (Franch.) Schindl.
11. *C. diversifolia* (Hemsl.) Schindl.
12. *C. falconeri* (Prain) Schindl.
13. *C. fulva* Schindl.
14. *C. grandifolia* Schindl.
15. *C. griffithii* Schindl.
16. *C. harmsii* Schindl.
17. *C. henryi* (Schindl.) Schindl.
18. *C. hirtella* (Franch.) Schindl.

19. *C. howellii* Schindl.
20. *C. latifolia* (Dunn) Schindl.
21. *C. luhitensis* H.Ohashi
22. *C. macrocarpa* (Bunge) Rehder
    - var. *macrocarpa*
        - f. *macrocarpa*
        - f. *alba* (S.Y.Wang) Iokawa & H.Ohashi
    - var. *hupehensis* (Pamp.) Iokawa & H.Ohashi
23. *C. macrostyla* (D.Don) Miq.
24. *C. pauciflora* C.J.Chen
25. *C. pinetorum* (Kurz) Schindl.
    - subsp. *pinetorum*
    - subsp. *albopubescens* (Iokawa & H.Ohashi) Iokawa & H.Ohashi
    - subsp. *velutina* (Dunn) H.Ohashi
26. *C. polyantha* (Franch.) Schindl.
    - var. *polyantha*
        - f. *polyantha*
        - f. *leiocarpa* (Pamp.) Iokawa & H.Ohashi
    - var. *neglecta* (Schindl.) Iokawa & H.Ohashi
27. *C. sargentiana* Schindl.
28. *C. speciosa* (Royle ex Schindl.) Schindl.
    - subsp. *speciosa*
    - subsp. *eriocarpa* (Schindl.) Iokawa & H.Ohashi
29. *C. stenocarpa* (Klotzsch) Schindl.
30. *C. sulcata* Schindl.
31. *C. tenuiramea* P.Y.Fu
32. *C. teretiracemosa* P.C.Li & C.J.Chen ex C.J.Chen
33. *C. thomsonii* (Benth. ex Baker) Schindl.
    - subsp. *thomsonii*
    - subsp. *splendens* (Schindl.) Iokawa & H.Ohashi
34. *C. trigonoclada* (Franch.) Schindl.
    - var. *trigonoclada*
    - var. *bonatiana* (Pamp.) Iokawa & H.Ohashi
35. *C. wenshanica* P.Y.Fu
36. *C. wilsonii* Schindl.
37. *C. yunnanensis* (Franch.) Schindl.
    - subsp. *yunnanensis*
    - subsp. *filipes* (Ricker) Iokawa & H.Ohashi

Key to the species

1. Leaves dimorphic; lower leaves petiolate with obovate leaflets and distinct rachis; upper leaves sometimes subsessile..........2
1. Leaves not dimorphic..............................3
2. Upper leaflets deltoid...11. *C. diversifolia*
2. Upper leaflets elliptic, orbicular or transversely elliptic....................16. *C. harmsii*
3. Leaflets consistently stipellate................4
3. Leaflets exstipellate, rarely including a few stipellate leaves................................5
4. Glandular hairs present in inflorescences ....26. *C. polyantha*
4. Glandular hairs absent............................... ....37. *C. yunnanensis*
5. Glandular hairs present in inflorescences 6
5. Glandular hairs absent 24
6. Calyx lobes usually more than 2 times longer than the tube, more than 3 mm long 7
6. Calyx lobes usually nearly equal to the length of tube or, if longer, shorter than 2 times the length of tube........................10
7. Style persistent at the apex of the fruit; leaflets usually shorter than 3 cm long, obdeltoid 8
7. Style mostly caducous except the basal part; pods mucronate at the apex; leaflets usually more than 3 cm long..................9
8. Bracts narrowly ovate, mostly caducous before flowering; pods elliptic, with filamentous style at the apex ....23. *C. macrostyla*
8. Bracts ovate, mostly persistent in flowering; pods oblong, with hardened hook-like style at the apex ....29. *C. stenocarpa*
9. Bracts narrowly ovate, usually shorter than 3 mm long; leaflet upper surfaces glabrous ....10. *C. delavayi*
9. Bracts linear, usually more than 3.5 mm long; leaflet upper surfaces densely puberulous..................25. *C. pinetorum*

10. Leaflet upper surfaces usually densely or subdensely puberulous (with patent, very short hairs), rarely glabrescent; branches velutinous...11
10. Leaflet upper surfaces glabrous or subdensely pubescent; branches not velutinous...13
11. Hairs white; leaflets broadly elliptic to ovate, often more than 8 cm long ....20. *C. latifolia*
11. Hairs tawny to pale brown; leaflets narrowly ovate to elliptic, usually less than 7 cm long...12
12. Racemes extended, often more than 10 cm long; bracts narrowly ovate, 2–2.5 mm long; bracteoles ca. 1 mm long........ ....13. *C. fulva*
12. Racemes usually less than 9 cm long; bracts narrowly ovate, 3–5 mm long; bracteoles ca. 2 mm long........................ ....30. *C. sulcata*
13. Flowers small; standard usually less than 9 mm long 14
13. Flowers larger; standard usually more than 10 mm long.................................16
14. Pods more than 10 mm long; leaflet lower surfaces densely white-pubescent ....21. *C. luhitensis*
14. Pods less than 8 mm long...................15
15. Pods acute, mucronate at the apex; leaflet lower surfaces with sparse, appressed short hairs........................8. *C. cytisoides*
15. Pods rounded, mucronate at the apex; leaflet lower surfaces densely white sericeous........................33. *C. thomsonii*
16. Leaflets small, usually less than 1 cm long, obdeltoid..................36. *C. wilsonii*
16. Leaflets usually more than 2 cm long, not obdeltoid...17
17. Bracts mostly persistent until fruiting; an additional phyllome often present at the base of the pedicel 18
17. Bracts usually caducous before flowering 23
18. Pods large, more than 14 mm long; inflorescences simple-racemose, short, 1–2 cm long.....................15. *C. griffithii*
18. Pods usually less than 10 mm long; inflorescences more than 2 cm long....19
19. Inflorescences usually paniculate; bracts mostly more than 2 mm long; petioles not dorsally angled..............................20
19. Inflorescences not paniculate; bracts mostly less than 2 mm long 22
20. Leaflets deltoid to ovate; lateral nerves thick, prominent beneath...18. *C. hirtella*
20. Leaflets obovate to oblong; lateral nerves not prominent 21
21. Leaves, branches and inflorescences densely ferruginous-pubescent................ ....2. *C. alopochroa*
21. Leaflet upper surfaces glabrous; leaflet lower surfaces, branches and inflorescences moderately whitish pubescent.... ....12. *C. falconeri*
22. Petioles sulcate, neither dorsally angled nor winged ....9. *C. decora*
22. Petioles dorsally angled, often slightly convex above, bisulcate and narrowly winged along both side ......17. *C. henryi*
23. Pedicels 2–4 mm long; calyx lobes narrowly triangular; vexillary stamen almost free; pods pubescent......6. *C. burmanica*
23. Pedicels usually more than 4 mm long; calyx lobes deltoid; vexillary stamen connate to staminal tube at the base for about one-fifth of its length; pods glabrous or pubescent ....22. *C. macrocarpa*
24. Petioles dorsally angled, often narrowly winged along the both sides; young branches distinctly angled....................25
24. Petioles neither dorsally angled nor winged 26
25. Young branches quadrangular; corollas purple..........................14. *C. grandifolia*
25. Young branches triquetrous; corollas yellow or purple............34. *C. trigonoclada*
26. Calyx lobes 3 times longer than the tube; flowers subsessile, clustered at the top of peduncle as an umbel; leaflet upper surfaces white-pubescent.............1. *C. alba*

26. Calyx lobes usually nearly equal to the tube or, if longer, shorter than 2 times the length of tube; inflorescences not umbelliform 27
27. Leaflet upper surfaces densely puberulous...28
27. Leaflet upper surfaces glabrous, sparsely pubescent or sericeous 29
28. Calyx, inflorescences, young branches and leaflets lower surfaces densely appressed sericeous; leaflets elliptic to oblong...............................3. *C. argentea*
28. Calyx, inflorescences, young branches and leaflet lower surfaces densely white-villous; leaflets obdeltoid to broadly obovate............................5. *C. brevifolia*
29. Pedicels usually less than 5 mm long..... 30
29. Pedicels usually more than 5 mm long..... 33
30. Flowers clustered at the upper part of racemes 31
30. Flowers distributed equally in racemes.... 32
31. Flowers larger; standard ca. 10 mm long; pedicels more than 1.5 mm long; racemes not terete ....19. *C. howellii*
31. Flowers small; standard ca. 7 mm long; pedicels less than 1.5 mm long; racemes terete, very densely flowered, spike-like ....32. *C. teretiracemosa*
32. Pods ovate to elliptic, pubescent; inflorescences axillary racemose ....28. *C. speciosa*
32. Pods narrowly ovate to narrowly elliptic; lateral surface of pods glabrous; inflorescences paniculate......................... ....35. *C. wenshanica*
33. Flowers 10 or more in a raceme 34
33. Flowers less than 8 in a raceme..........36
34. Leaflets obdeltoid to obcordate; lateral nerves dense, straight, parallel................ ....4. *C. bonii*
34. Leaflets elliptic to obovate; lateral nerves arcuate with netted venation................35
35. Pedicels slender, 6–14 mm long; leaflets chartaceous ....7. *C. capillipes*
35. Pedicels thick, 5–6 mm long; leaflets subcoriaceous.............27. *C. sargentiana*
36. Pedicels more than 15 mm long; vexillary stamen connate to the tube at the base for about one-sixth of its length ....24. *C. pauciflora*
36. Pedicels less than 8 mm long; vexillary stamen connate to the tube at the base for about one-third of its length ....31. *C. tenuiramea*

Enumeration of the species

In this enumeration the species are arranged in alphabetical order of specific epithet. In the following description the length of the keel-petals is shown as a total of the length measured from the base of the claw to the inflexed point at about the middle of lamina plus that measured from this point to the apex of the lamina, because the keel is inflexed near the middle of the lamina. Specimens examined are cited in alphabetical order in every species: first for the countries, second for the provinces in China, and third for collector's name and collection numbers within every countries and provinces.

1. **Campylotropis alba** Schindl. ex Iokawa & H.Ohashi in J. Jpn. Bot. **72**: 139 (1997) [Type: China. A. Hosie 7 (E holo., photo in TUS)]. [Figs. 10a, 11A]

Young branches with dense white soft hairs. Leaves with a minute rachis. Stipules 3–4 mm long, ca. 1 mm wide, abaxial surface white-tomentose. Petioles ca. 1.5 mm long, white-tomentose. Leaflets subcoriaceous, broadly obovate, rounded to retuse and mucronulate at the apex, obtuse at the base, upper surface sparsely covered with ascending soft hairs, lower surface more densely pubescent; terminal leaflets ca. 1 cm long, 8 mm wide. Stipels absent. Inflorescences umbel-like racemose with reduced axes; peduncles ca. 1.5 cm long, densely ascend-

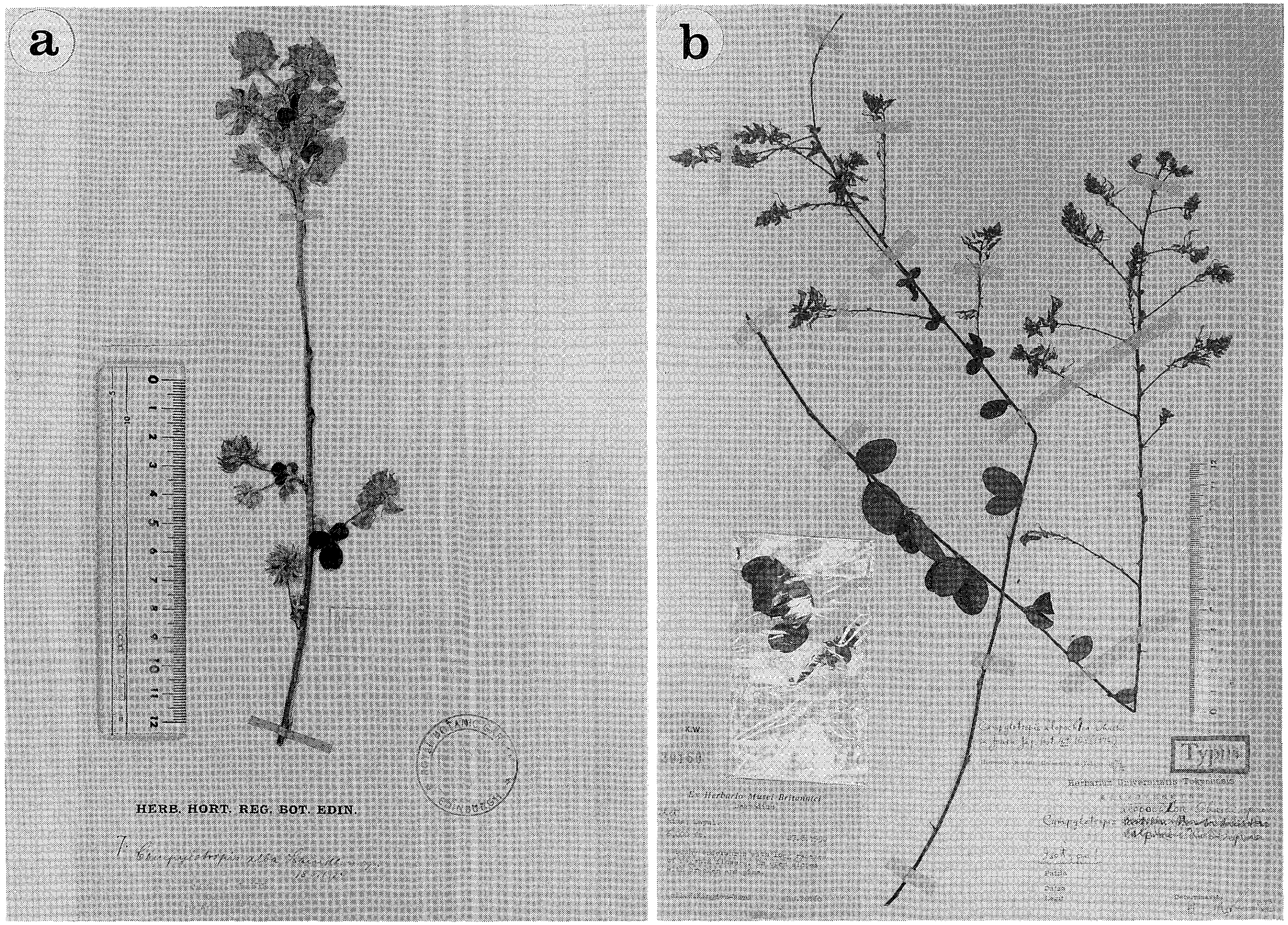

Fig. 10. a: *Campylotropis alba* Schindl. ex Iokawa & H.Ohashi (voucher specimen: Hosie 7, E). b: *C. alopochroa* H.Ohashi (Kingdon-Ward 20160, TI).

ing sericeous. Bracts ca. 1.5 mm long, 0.3 mm wide. Pedicels short, ca. 1.5 mm long, ascending sericeous. Bracteoles ca. 1.3 mm long, usually caducous before anthesis. Calyx deeply 4-lobed, densely ascending sericeous; tube ca. 2 mm long; upper lobe narrowly triangular, tapering toward the apex, ca. 6 mm long with two teeth, teeth ca. 1 mm long; lower lobe narrowly triangular with a tapering apex, 6–7 mm long, ca. 1 mm wide. Standard broadly obovate, rounded at the apex, ca. 9.5 mm long (including the ca. 1 mm long claw), 8 mm wide; wings ca. 9.5 mm long (including ca. 1.7 mm long claw), 4.5 mm wide; keel-petals ca. 14.5 mm long (including ca. 1.7 mm long claw). Androecia ca. 9 mm long, vexillary stamen connate to staminal tube for about one-third of its length. Gynoecia ca. 11.5 mm long; ovary ca. 2.5 mm long; style ca. 9 mm long.

Specimen examined: CHINA. (A.Hosie s.n., E–holotype, photo in TUS).

Distribution. SW China.

This species is known only from the type specimen. It must have been collected in Guizhou, Sichuan or Yunnan, because, according to Bretschneider (1898), Hosie explored these regions in 1882–1883.

Campylotropis alba is similar to *C. macrostyla* in having umbel-like short racemes, but the former has much shorter pedicels and much longer calyx lobes. The pedicels are about 1.5 mm long, the calyx lobes are 6–7 mm long which are almost three times as long as the calyx tube, while in *C. macrostyl*a pedicels are 3–9 mm long and calyx lobes are 2.5–3.3 mm long which are usually two times as long as the calyx tube.

2. **Campylotropis alopochroa** H.Ohashi in J. Jpn. Bot. **49**: 108 (1974), ut *alopochloa* [Type: China. Xizang as Tibet. Zayu Xian. F. Kingdon-Ward 20160 (BM holo.; TI iso.)]. [Figs. 10b, 11B]

An erect or ascending shrublet, usually 50–100 cm high; stems densely ferruginous-pubescent. Leaves with a short rachis; rachis 2–4 mm long. Stipules 4–7 mm long, ca. 1 mm wide. Petioles 1–1.5 cm long, with dense ascending hairs. Leaflets coriaceous, obovate to elliptic, retuse and mucronulate at the apex, obtuse at the base, upper surface sparsely covered with ascending short hairs, lower surface more densely pubescent; terminal leaflets ca. 2–2.5 cm long, 1–2 cm wide. Stipels absent. Inflorescences 6–8 cm long, usually large paniculate; rachis and pedicels with dense ferruginous patent hairs and sparse glandular hairs. Bracts ca. 2–2.5 mm long. Pedicels 4–5 mm long. Bracteoles ca. 1 mm long. Calyx deeply 4-lobed, densely ascending sericeous with glandular hairs; tube ca. 1.5 mm long; lobes narrowly triangular, 2.5–3 mm long. Corolla purplish red; standard obovate or narrowly elliptic, obtuse at the apex, ca. 12 mm long, 4–4.5 mm wide; wings 10–11 mm long (including the ca. 3 mm long claw), 3–3.8 mm wide; keel-petals ca. 14 mm long (including the ca. 3 mm long claw). Androecia ca. 12 mm long, vexillary stamen connate to staminal tube for about one-fifth of its length. Gynoecia ca. 13 mm long; ovary ca. 2 mm long; style10.5–11 mm long.

Specimen examined: CHINA. **Xizang** (Tibet). Zayu Xian (F. Kingdon-Ward 20160, TI–isotype).

Distribution. China (Xizang). (Fig. 14 a)

This species is similar to *Campylotropis hirtella* and *C. falconeri* sharing a large panicle-like inflorescence composed of several upper racemes with reduced subtending leaves with them. However, *C. hirtella* is distinguished from *C. alopochroa* in having larger flowers (13–15 mm long in the former against ca. 12 mm long) and deltoid leaflets with prominent lateral nerves at the lower surface. *Campylotropis falconeri* differs from *C. alopochroa* in the absence of ferruginous hairs on leaves, branches and inflorescences.

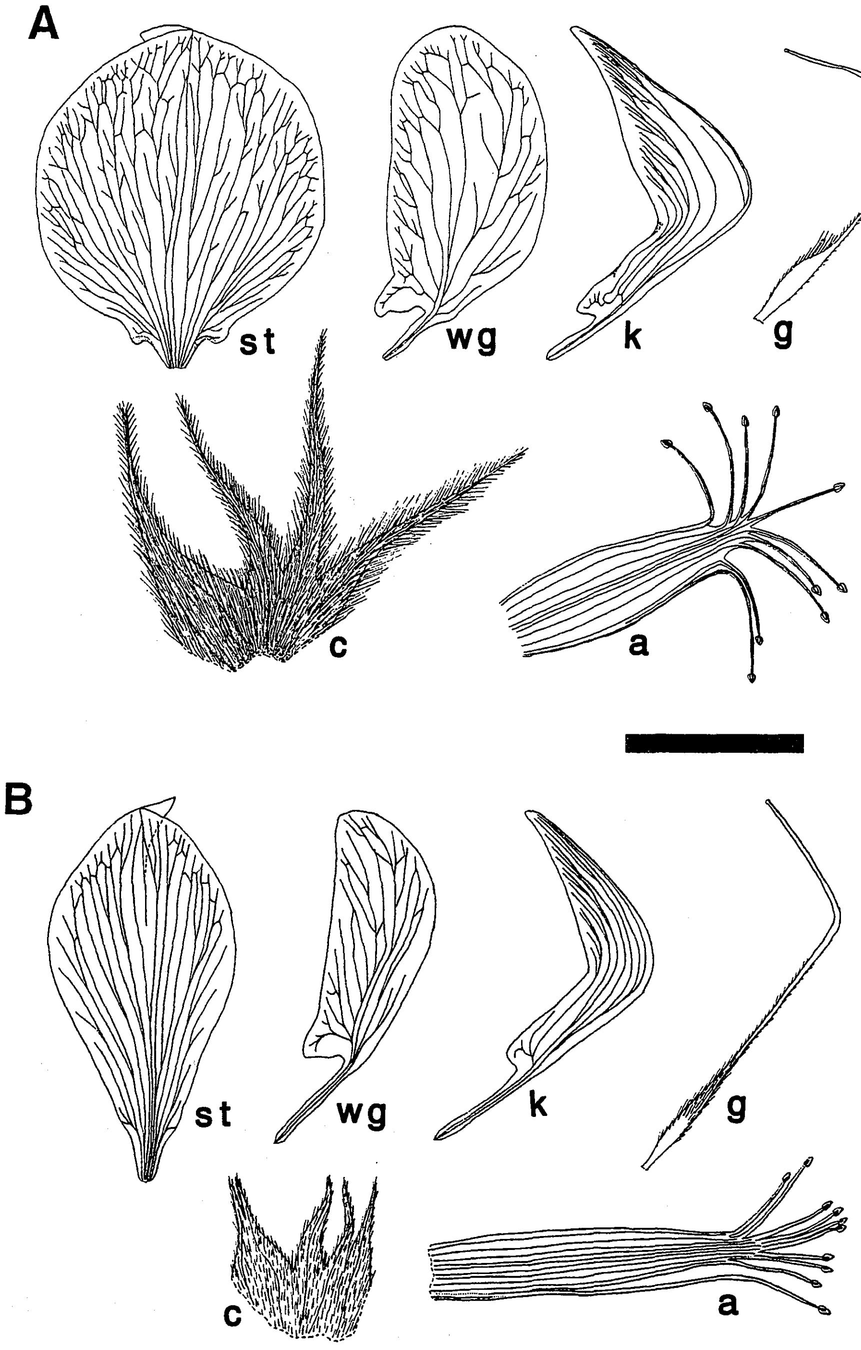

Fig. 11. Flowers of *Campylotropis alba* (A. voucher specimen: Hosie 7, E) and *C. alopochroa* (B. Kingdon-Ward 20160, TI). a: androecium, c: calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

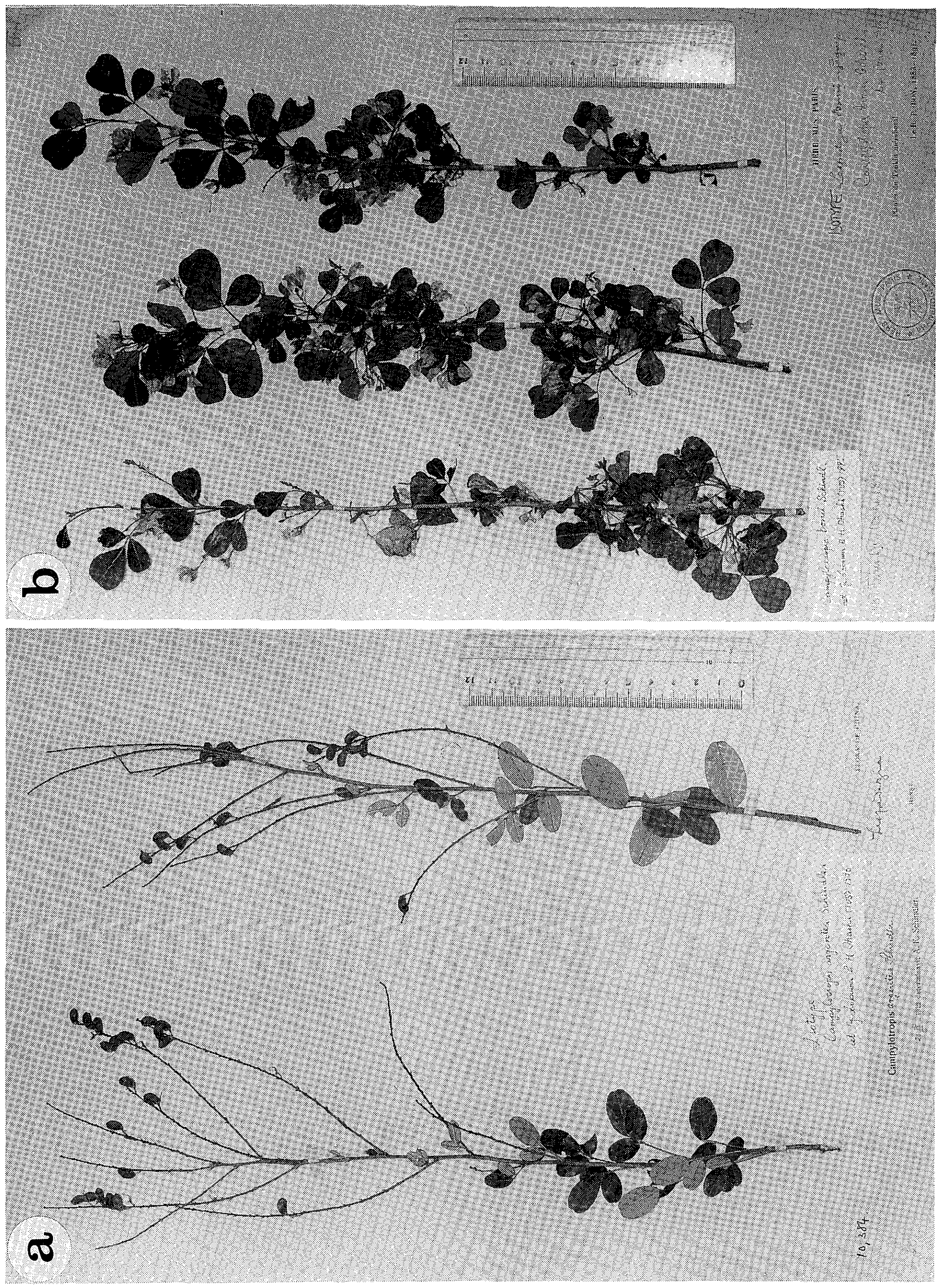

Fig. 12. a: *Campylotropis argentea* Schindl. (voucher specimen: Henry 10384, A). b: *C. bonii* Schindl. (Bon 4320, P)

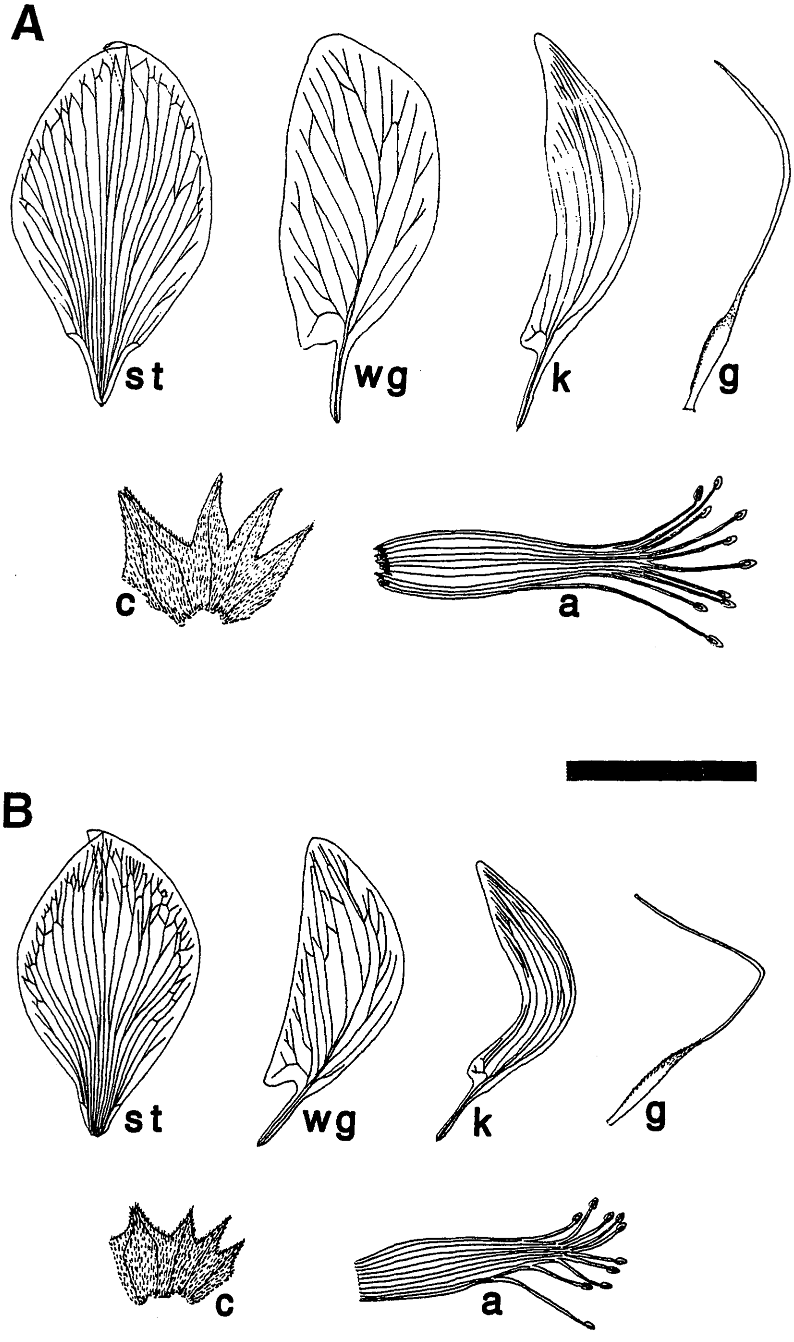

Fig. 13. Flowers of *Campylotropis argentea* (A. voucher specimen: Henry 10384, E) and *C. bonii* (B. Bot. Gardens Singapore Field No. 4079, K). a: androecium, c: calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

3. **Campylotropis argentea** Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 426 (1912) [Type: China. Yunnan. Mengzi Xian, 5000 ft. A.Henry 10384 (A, B, K syn.; CAL, E, MO, PE isosyn.)]; C.Y.Wu & al., Index Fl. Yunnan. **1**: 573 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 50 (1987), & in Fl. Reip. Pop. Sin. **41**: 123 (1995). [Figs. 12a, 13A]

Lespedeza argentea (Schindl.) H.Lév., Cat. Pl. Yun-Nan 157 (1916).

A shrub or shrublet, usually 50–100 cm high; young stems densely appressed sericeous. Leaves with a distinct rachis; rachis 1–10 mm long. Stipules 1.5–4.5 mm long, 0.6–1 mm wide. Petioles 1.5–4 cm long, densely appressed hairy. Leaflets coriaceous, elliptic to oblong, retuse and mucronulate at the apex, rounded at the base, upper surface puberulent, lower surface whitish or silvery with dense appressed silky hairs; terminal leaflets ca. 1.2–3 cm long, 0.7–2 cm wide. Stipels rarely present, linear, ca. 2 mm long. Inflorescences 5–15 cm long, often paniculate; rachis and pedicels with dense ascending short hairs. Bracts ca. 1–2 mm long. Pedicels 1.5–4 mm long. Bracteoles ovate, acute at the apex, 0.4–0.7 mm long. Calyx deeply 4-lobed, with appressed short hairs; tube ca. 1.5 mm long; lobes triangular to narrowly triangular, ca. 2 mm long. Corolla purple; standard obovate, obtuse at the apex, 9–10 mm long, 5.5–7 mm wide; wings ca. 10 mm long (including ca. 2 mm long claw), ca. 4 mm wide; keel-petals inflexed at an obtuse angle, ca. 11.5 mm long (including ca. 2 mm long claw). Androecia ca. 9.5 mm long, vexillary stamen connate to staminal tube for about one-third of its length. Gynoecia ca. 10 mm long; ovary appressed puberulent near the suture and apex, ca. 2.5 mm long; style ca. 7 mm long. Pods obliquely oblong, rounded at the apex, with subappressed short hairs, 7–9 mm long, 3.5–5 mm wide. Seeds reniform, dark reddish-brown, 2–2.2 × 3.5–4 mm in size.

Specimens examined: CHINA. **Yunnan**. Mengzi Xian, 5000 ft. (A. Henry 10384, syntypes in A, K; isosyntypes in CAL, E, LE, MO, PE); Shinping Xian, 1500 m (H.T.Tsai 53450, A, PE).

Distribution. China (Yunnan). (Fig. 14b).

This species is similar to *Campylotropis brevifolia* in having rather small flowers and whitish hairs on the lower surface of the leaflets, young branches and calyces. *Campylotropis brevifolia* is, however, characterized by having small, obovate leaflets and woolly hairs.

4. **Campylotropis bonii** Schindl. in Bot. Jahrb. **54**: 64 (1916) [Type: Vietnam, Ha Nam Ninh. Bon 4320 (P holo.)]; P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 40 (1987), & in Fl. Reip. Pop. Sin. **41**: 113 (1995); Thuân in Fl. Camb. Laos Viêt. **23**: 143, pl. 25: 1–9 (1987). [Figs. 12b, 13B]

Lespedeza bonii (Schindl.) Gagnep. in Lecomte, Fl. Gén. Indoch. **2**: 520, fig. 51 (1920).

Campylotropis bonii Schindl. var. *anguticarpa* Schindl. in Repert. Nov. Regni. Veg. **22**: 271 (1926) [Type: Thailand, Small island near Pulan Panje. Herb. Hort. Singapore no. 4079 (BM holo.; K iso.)], **syn. nov**.

A shrub; young stems with appressed short hairs. Leaves with a distinct rachis; rachis 1–8 mm long, usually many at the short branches. Stipules 1–3 mm long, 0.5–1 mm wide. Petioles 0.5–3 cm long, densely appressed hairy. Leaflets subcoriaceous, obdeltoid to obcordate, retuse and mucronulate at the apex, cuneate at the base, upper surface glabrous, lower surface appressed hairy; terminal leaflets 1.5–4 cm long, 0.8–3 cm wide; lateral nerves dense straight, parallel. Stipels sometimes present, linear. Inflorescences densely flowered, ca. 2 cm long. Bracts 0.5–3 mm long. Pedicels 4–8 mm long, with appressed short hairs. Bracteoles 0.5–1 mm long, persistent in anthesis. Calyx with appressed short hairs;

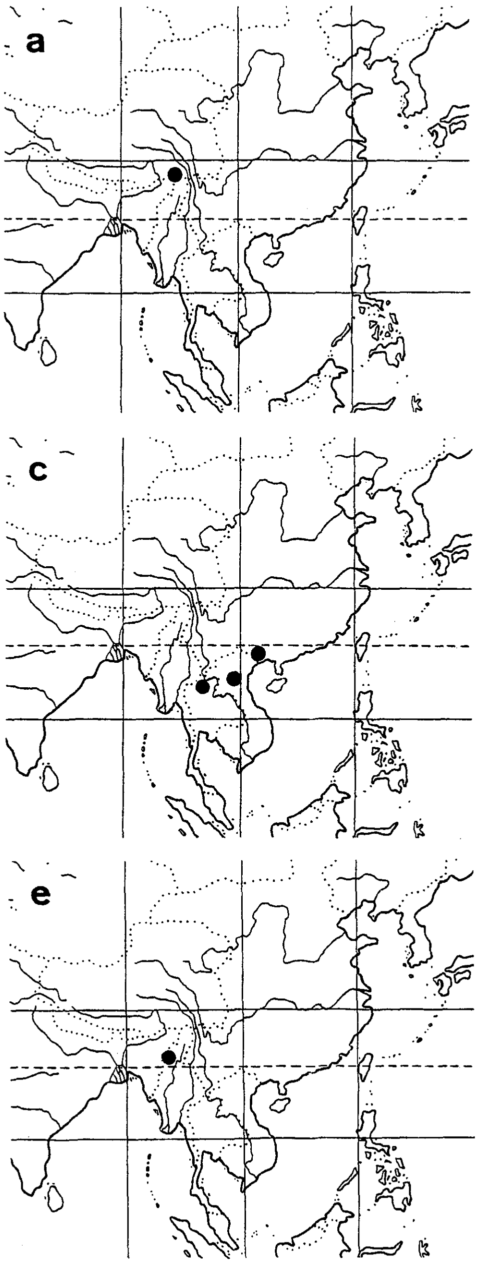

Fig. 14. Distribution of *Campylotropis* (I). a: *C. alopochroa*, b: *C. argentea*, c: *C. bonii*, d: *C. brevifolia*, e: *C. burmanica*, f: *C. capillipes* (●: subsp. *capillipes*, ○: subsp. *prainii*).

tube ca. 1.5 mm long; lobes triangular to narrowly triangular, ca. 1 mm long. Standard obovate to elliptic, obtuse at the apex, narrowed to a claw, 8–9 mm long, ca. 5 mm wide; wings ca. 9 mm long (including ca. 1.5 mm long claw), ca. 3 mm wide; keel-petals ca. 8.5 mm long (including ca. 1.5 mm long claw). Androecia ca. 7.5 mm long, vexillary stamen connate to the staminal tube at the base. Gynoecia ca. 8 mm long; ovary puberulent. Pods obliquely oblong, rounded at the apex, with subappressed short hairs, 13–16 mm long, 5–8 mm wide. Seeds reniform, ca. 3 × 6 mm in size.

Specimens examined: CHINA. **Guangxi**. Longzhou Xian, 300–550m (S. X. Chen 13020, KUN, MO), 730 m (S. X. Chen 13404, KUN, MO); Pin-lam, 2900 ft. (Guangxi Exped. 3305, PE ; S. P. Ko 55627, A); Debao Xian (Z. T. Li 601943, KUN); Longzhou Xian, 600 m (P. X. Tan 57345, MO).

THAILAND. Small island near Pulan Panje (Bot. Gardens Singapore Field No. 4079, BM–holotype of *Campylotropis bonii* Schindl. var. *angusticarpa* Schindl., K–isotype).

VIETNAM. Ha Nam Ninh, Tuan Du (Bon 4320, P–isotype of *C. bonii* Schindl.); locality unknown (Cino-Vietnam Exped. s.n., KUN); Annam, 390 m (M. E. Poilane 16460, TUS).

Distribution. China (Guangxi), Vietnam and Thailand. (Fig. 14c)

The stipels of this species are present only in the Chinese specimens. This species shares obcordate leaflets with dense parallel lateral nerves with *Campylotropis stenocarpa*. However, *C. stenocarpa* has much longer calyx-lobes (2.6–4 mm long against ca. 1 mm long in *C. bonii*); the persistent hook-like style and glandular hairs on the inflorescences and is distributed in the Himalayas.

5. **Campylotropis brevifolia** Ricker in J. Wash. Acad. Sci. **36**: 37 (1946) [Type: China. Sichuan. Datung to Delifu, Yalong Jiang, 1250–1500m. Handel-Mazzetti 5604 (A syn., E isosyn.), Yanyuan Xian, 1600 m. T. T. Yü 1450 (A syn., E, PE isosyn.)]; P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 32 (1987), & in Fl. Reip. Pop. Sin. **41**: 107 (1995). [Figs. 15a, 16A]

Campylotropis yajiangensis P.Y.Fu var. *deronica* P.Y.Fu in Bull. Bot. Res., Harbin **7** (4): 34 (1987) [Type: China. Sichuan. Derongxian, in declivibus siccis apricis, alt. 3500 m. (Dezi 4152, CDBI holo., n. v.; KUN, PE iso.)], & in Fl. Reip. Pop. Sin. **41**: 108 (1995), **syn. nov**.

A shrub or shrublet, usually 80–200 cm high; stems glabrescent, young parts densely white-villous. Leaves with a minute rachis; rachis 1–5 mm long. Stipules triangular, ca. 1.5 mm long, 1 mm wide. Petioles 0.5–1 cm long, densely white-villous. Leaflets coriaceous, obdeltoid to broadly obovate, retuse and mucronulate at the apex, obtuse at the base, upper surface densely puberulent, lower surface densely white-villous; terminal leaflets ca. 0.6–1.6 cm long, 0.5–1.2 cm wide. Stipels absent. Inflorescences 1–2 cm long, few flowered; rachis and pedicels with dense ascending soft hairs. Bracts 1–1.2 mm long. Pedicels 1.5–2 mm long. Bracteoles 0.5–1 mm long, persistent in anthesis. Calyx with dense ascending soft hairs; tube 1.5–1.8 mm long; lobes triangular, nearly the same length as the tube. Corolla reddish-purple; standard obovate, rounded at the apex, obtuse at the base, ca. 10 mm long (including ca. 0.7 mm long claw), ca. 5.5 mm wide; wings ca. 9.5 mm long (including ca. 2 mm long claw), ca. 3.5 mm wide; keel-petals ca. 13.5 mm long (including ca. 2 mm long claw). Androecia ca. 9.5 mm long, vexillary stamen connate to staminal tube for about one-third of its length. Gynoecia ca. 11 mm long; ovary ca. 2.5 mm long; style ca. 8 mm long. Pods obliquely obovate, with ascending short hairs.

Specimens examined: CHINA. **Sichuan**. Batang Xian, 3100 m (Dezi 3909, PE); Derong Xian, 3500 m (Dezi 4152, KUN, PE–isotype of *C. yajiangensis* var. *deronica* P.Y.Fu); Datung to Delifu, Yalong Jiang, 1250–1500 m (Handel-Mazzetti 5604, A–syntype of *C. brevifolia* Ricker, E–isosyntype); Batang Xian, 2650 m (Tang & Xia 5589, PE); Yanyuan Xian, 1600

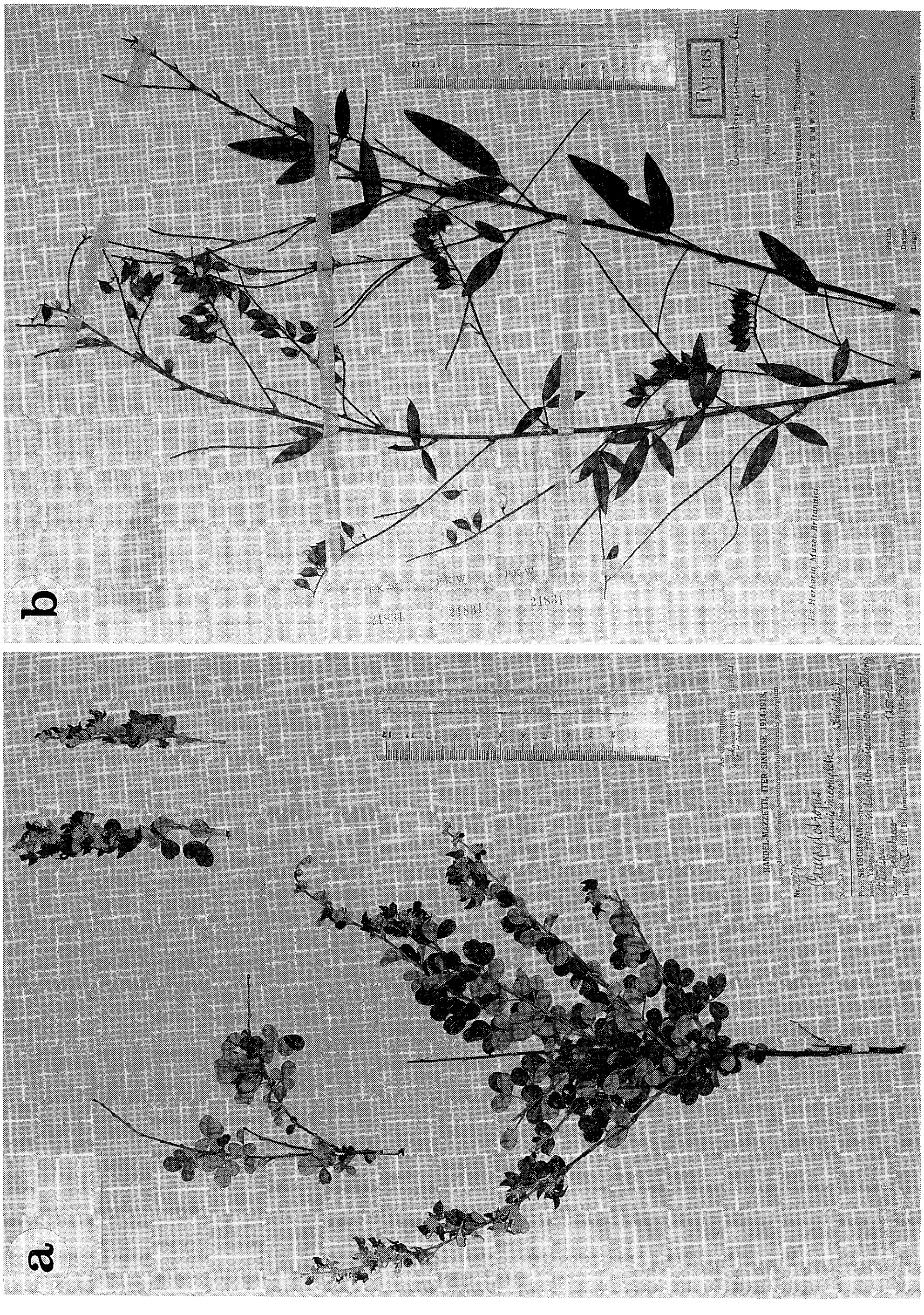

Fig. 15. a: *Campylotropis brevifolia* Ricker (voucher specimen: Handel-Mazzetti 5604, A). b: *C. burmanica* H.Ohashi (Kingdon-Ward 21831, TI).

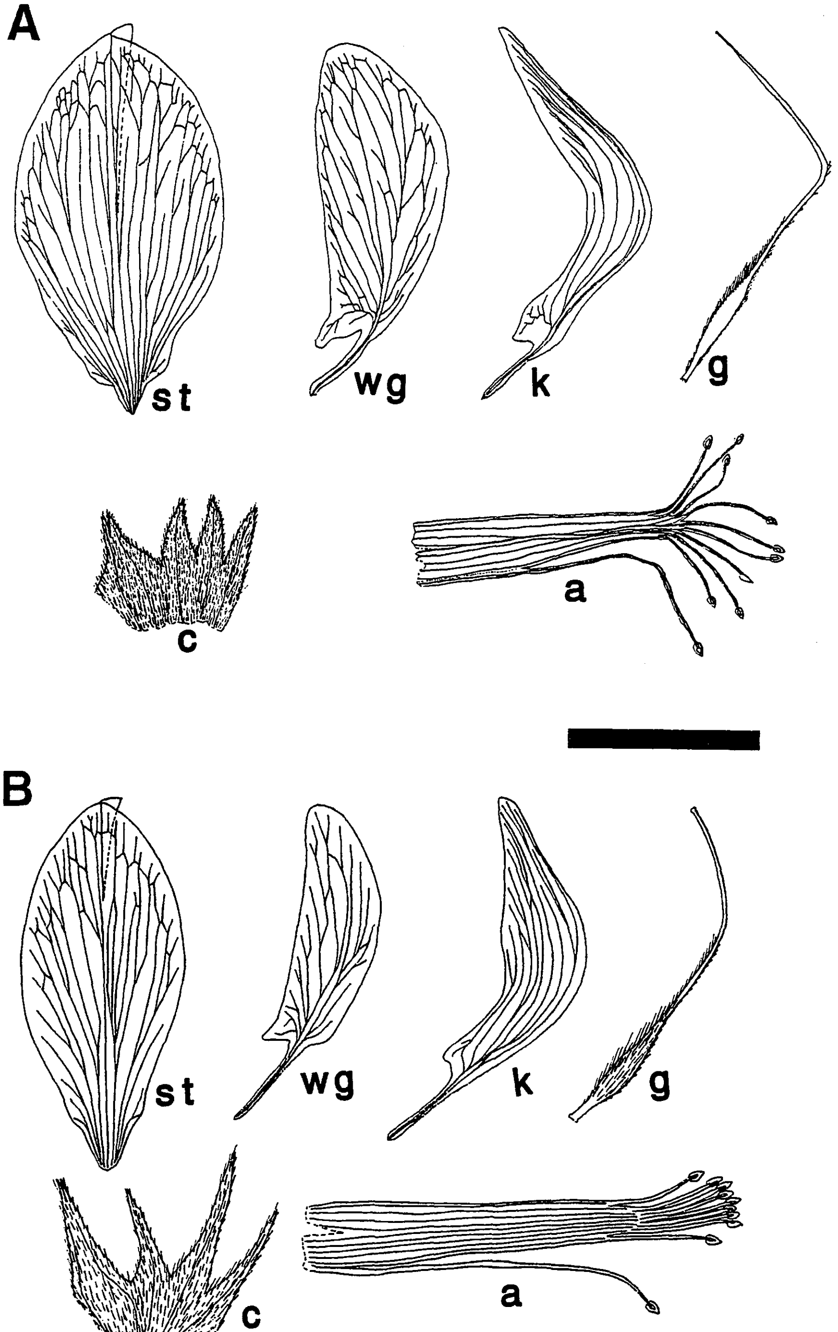

Fig. 16. Flowers of *Campylotropis brevifolia* (A. voucher specimen: Handel-Mazzetti 5604, A) and *C. bumanica* (B. Kingdon-Ward 21831, TI). a: androecium, c: calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

m (T. T. Yü 1450, A–syntype of *C. brevifolia* Ricker, PE–isosyntype).

Distribution. China (Sichuan and Xizang). (Fig. 14 d)

The less hairy forms of this species resemble *Campylotropis wilsonii*. Even in such a form, this species is easily distinguished from *C. wilsonii* by the densely puberulent upper surface of the leaflets (glabrous or glabrescent upper surface of the leaflets in *C. wilsonii*) and dense ascending soft hairs on the inflorescences (sparse, ascending, short hairs with glandular hairs in *C. wilsonii*). *Campylotropis yajiangensis* var. *deronica* is identical with *C. brevifolia*, although it was characterized in having only one or two flowers in a raceme.

6. **Campylotropis burmanica** H.Ohashi in J. Jpn. Bot. **49**: 41 (1974) [Type: Myanmar (Burma). Mindat. F. Kingdon-Ward 21831 (BM holo.; TI iso.)]. [Figs. 15b, 16B]

A shrub; young stems with dense appressed short hairs. Leaves with a distinct rachis, rachis 2–7 mm long. Stipules 6–9 mm long, 1–1.5 mm wide. Petioles 1.5–3.5 cm long, densely appressed hairy. Leaflets coriaceous, narrowly elliptic to narrowly ovate, mucronulate at the apex, obtuse at the base, upper surface glabrous, lower surface densely ascending hairy; terminal leaflets 3–5.5 cm long, 1–1.4 cm wide. Stipels absent. Inflorescences 7–15 cm long; rachis and pedicels with dense ascending short hairs mixed with glandular hairs. Bracts ca. 2 mm long, caducous before anthesis. Pedicels 3–4 mm long. Bracteoles narrowly ovate, ca. 0.5 mm long. Calyx deeply 4-lobed, with dense appressed short hairs and sparse glandular hairs; tube 1.5–2 mm long; lobes narrowly triangular, 2–3 mm long. Standard elliptic, obtuse at the apex, 9.5–10.5 mm long (including ca. 1.4 mm long claw), 4.5–5.5 mm wide; wings obliquely elliptic, 9–9.5 mm long (including ca. 2.4 mm long claw), ca. 3 mm wide; keel-petals ca. 12.5 mm long (including ca. 2.2 mm long claw). Androecia 9–10.5 mm long, vexillary stamen almost free. Gynoecia ca. 10 mm long; ovary appressed puberulent near the suture and apex, ca. 3 mm long; style ca. 7 mm long. Pods obliquely obovate, obtuse at the apex, with subappressed short hairs, 8–12 mm long, 4–4.5 mm wide. Seeds reniform, 2–2.5 × 4–4.5 mm in size.

Specimen examined: MYANMAR (BURMA). Mindat, 1500 m (F. Kingdon-Ward 21831, TI-isotype).

Distribution. Myanmar (Burma). (Fig. 14e)

This species is similar to *Campylotropis cytisoides* in the leaflets and inflorescences, but it has larger flowers (9.5–10.5 mm long in *C. burmanica* against less than 9 mm long in *C. cytisoides*) and brownish hairs (white to yellowish white hairs in *C. cytisoides*).

7. **Campylotropis capillipes** (Franch.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 341 (1912), & in Hand.-Mazz., Symb. Sin. **7**: 573 (1933); Fl. Illust. Pl. Prim. Sin. 540, fig. 535 (1955); C.Y.Wu & al., Index Fl. Yunnan. **1**: 573 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 28 (1987), & in Fl. Reip. Pop. Sin. **41**: 98 (1995). [Figs. 17, 18A]

Lespedeza capillipes Franch., Pl. Delavay. 165 (1890) [Type: China. Yunnan. in dumetis montis Che-tzo-tzan et ad Ta-long-tan, supra Tapin-tze Delavay 530 (P syn.); in monte Hee-chan-men. Delavay 2733 (P syn., photo in A)]; H.Lév., Cat. Pl. Yun-Nan 157 (1916).

A shrub, usually 100–200 cm high; young stems with appressed short hairs. Leaves with a short rachis; rachis 1–4 mm long. Stipules 1.5–6 mm long, 0.4–0.8 mm wide. Petioles 0.3–2 cm long, densely appressed short hairy. Leaflets chartaceous, obovate to oblong, retuse and mucronulate at the apex, obtuse at the base, sparsely appressed short hairy on both surfaces, or glabrous on upper surface; terminal leaflets 1–2.3 cm long, 0.6–

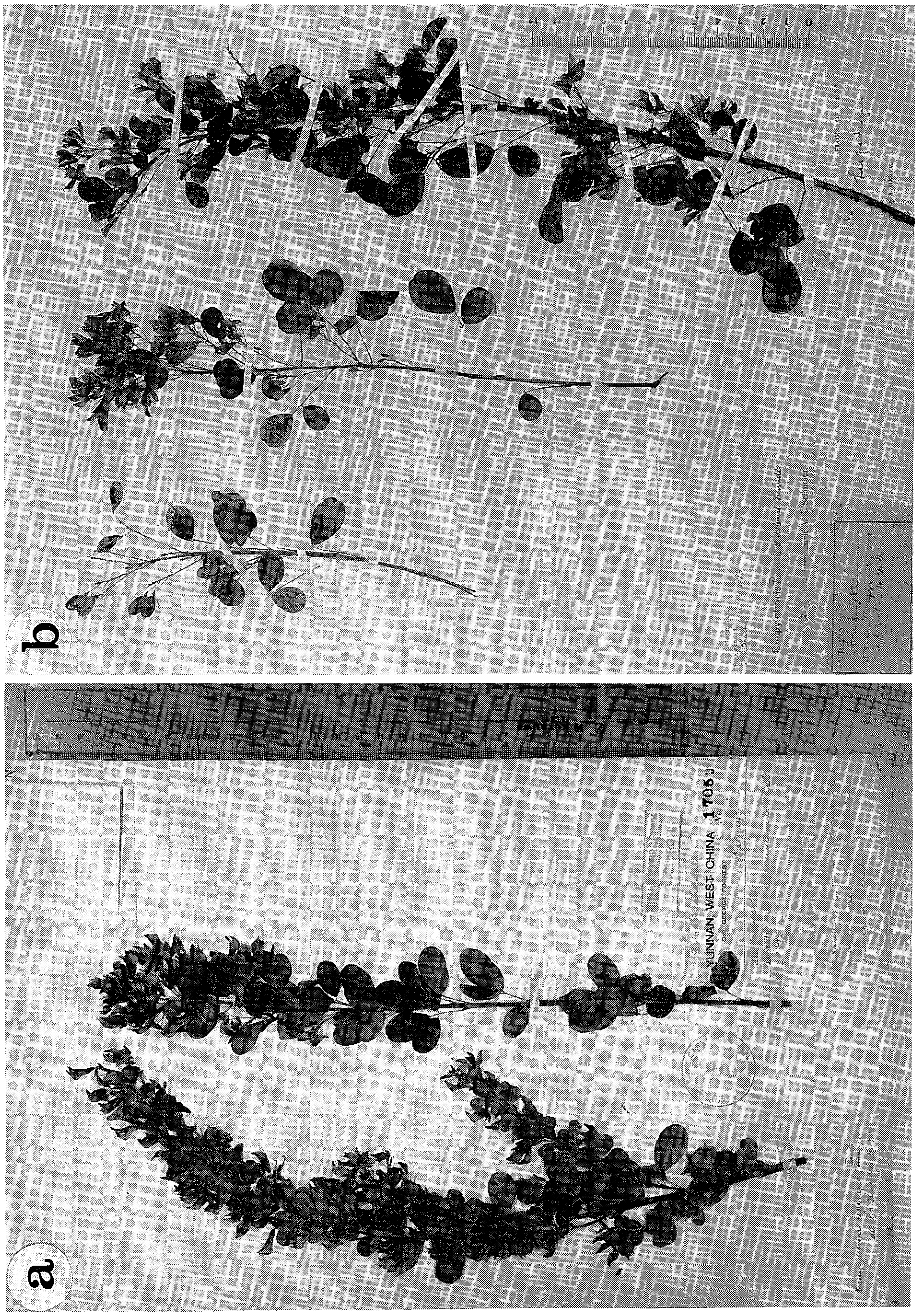

Fig. 17. a: *Campylotropis capillipes* (Franch.) Schindl. subsp. *capillipes* (voucher specimen: Forrest 17059, E). b: *C. capillipes* (Franch.) Schindl. subsp. *prainii* (Coll. & Hemsl.) Iokawa & H.Ohashi (Henry 12712, A).

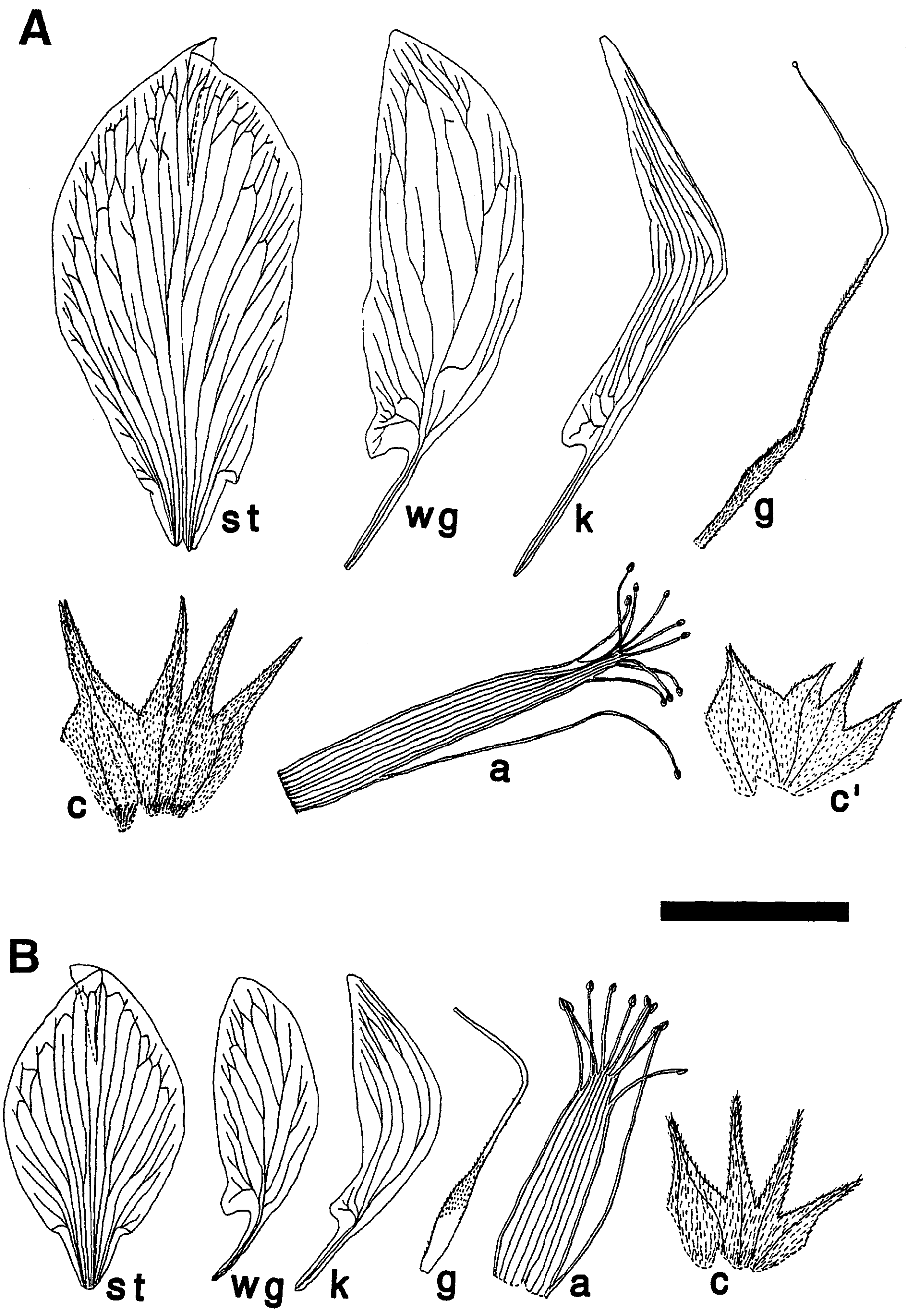

Fig. 18. Flowers of *Campylotropis capillipes* (A. c': subsp. *prainii*, voucher specimen: Lace 4999, E; others: subsp. *capillipes*, Forrest 17059, E) and C. *cytisoides* f. *parviflora* (B. Iokawa 5390, TUS). a: androecium, c, c': calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

1.4 cm wide. Stipels absent. Inflorescences subdensely flowered, 1.5–8 cm long. Bracts 0.6–1.5 mm long. Pedicels slender, subfiliform, 6–14 mm long, with appressed short hairs. Bracteoles 0.4–1 mm long. Calyx with appressed short hairs; tube 1.8–2.7 mm long; lobes triangular to narrowly triangular. Corolla purple to reddish-purple; standard elliptic, obtuse at the apex, 10–14 mm long (including ca. 1.5 mm long claw), 6–7 mm wide; wings 10–14 mm long (including 2.5–3.5 mm long claw), 3–4 mm wide; keel-petals ca. 12–16 mm long (including ca. 2.5–3.5 mm long claw). Androecia 10–11.5 mm long, vexillary stamen connate to staminal tube for about one-fourth of its length. Gynoecia ca. 14 mm long; ovary puberulent or glabrous, ca. 3.5 mm long; style ca. 10 mm long. Pods obliquely elliptic, obtuse at the apex, appressed short hairy or glabrous, 8–11 mm long, 4.5–6 mm wide. Seeds reniform, reddish-brown, ca. 2 × 3 mm in size.

Distribution. China (Sichuan, Yunnan and Guangxi), Myanmar (Burma) and Thailand (Fig. 14f)

Campylotropis prainii is similar to *C. capillipes* except in having shorter calyx lobes, longer racemes and a less hairy upper surface on the leaflet. In the present paper, therefore, the former is regarded as a subspecies of the latter, because subsp. *capillipes* is distributed only in western Sichuan and northern Yunnan, while subsp. *prainii* rather widely in the southern areas of the species' range, i.e. western Guangxi and southern Yunnan, Myanmar and Thailand.

Key to the subspecies of *C. capillipes*

1. Calyx lobes almost as long as the tube, more than 1.5 mm long; racemes short, 1.5–3 cm long; upper surface of leaflets with sparse, appressed, short hairs ....subsp. *capillipes*
1. Calyx lobes distinctly shorter than the tube, 1–1.5 mm long; racemes 2–8 cm long; upper surface of leaflets glabrous...... ....subsp. *prainii*

7-1. *Campylotropis capillipes* (Franch.) Schindl. subsp. **capillipes** [Figs. 17c, 18A]

Specimens examined: CHINA. **Sichuan**. Muli Xian, 9000–10000 ft. (G. Forrest 17059, E). **Yunnan**. Lijiang valley (R. C. Ching 30686, A); Eryuan Xian, Mt. Heishanmen (Delavay 2733, A–photo of syntype of *Lespedeza capillipes* Franch.); locality unknown (Delavay 2907, A); Chiao-chia Xian (W. P. Fang 9615, A, E); Western flank of the Dali Range, 10000 ft. (G. Forrest 11548, A, E); Mt.Tungshan, 9000 ft. (G. Forrest 12717, E); Pupiao, Salween divide, 8000 ft. (G. Forrest 13578, E; G. Forrest 23162, E, A); Dschenmindo, Yangtze R., 1800 m (Handel-Mazzetti 5655, A, K); Dali to Lijiang, 2200–2500 m (Handel-Mazzetti 8538, E); Dali, Mt. Moning (McLaren's collectors C10, A, E); Yongning (McLaren's collectors 124, A, BM, E); Mt. Chaochou (McLaren's collectors L157A, E); Tungshan, east of Lijiang, Yangtze (J.F.Rock 10503, A, E); Pe Yen Tsin (P.S.Ten 4, A).

Distribution. China (Sichuan and Yunnan). (Fig. 14f)

7-2. *Campylotropis capillipes* (Franch.) Schindl. subsp. **prainii** (Coll. & Hemsl.) Iokawa & H.Ohashi, **comb. nov.**

[Figs. 17b, 18A–c']

Lespedeza prainii Coll. & Hemsl. in J. Linn. Soc. Bot. **28**: 46 (1890) [Type: Myanmar (Burma), Shan. H. Collett 951 (K holo.)]; H.Lév., Cat. Pl. Yun-Nan 158 (1916).

Campylotropis prainii (Coll. & Hemsl.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 341 (1912), & in Sargent, Pl. Wils. **2**: 115 (1914); C.Y.Wu & al., Index Fl. Yunnan. **1**: 576 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 28 (1987), & in Fl. Reip. Pop. Sin. **41**: 98 (1995).

Specimens examined: CHINA. **Guangxi**. Longlin, 500–600 m (C. C. Chang 10049, MO), loc. cit., 1000 m (C. C. Chang 10757, KUN, MO). **Yunnan**. Mar-li-po, Pan-chia-chu, 1500 m (K. M. Feng 12623, A); Mengzi Xian, 5000 ft. (A. Henry 9803, A), loc. cit., 5500 ft. (A. Henry 9803A, E, K, MO; A. Henry 9803B, A, K, MO); Szemao, 5000 ft. (A. Henry 13366, E); locality unknown (E. E. Maire 269, E); west of the

Mekong, en route from Pingpo to Youngchang and Tengchong (J. F. Rock 6970, A, E); Tengchong to Longling (J. F. Rock 7246, A, E); Lu-se, 1550 m (H. T. Tsai 56331, A); Mengzi Xian, Bei-chu-hoo, 1700 m (C. W. Wang 83256, KUN); Mienning, Poshang, 2500 m (T. T. Yü 17876, A, E); Xishuanbanna, Menghai, 1100 m (Yunnan Trop. Exped. 60-11605, KUN).

MYANMAR (BURMA). Shan States, Shan hills plateau, 4000 ft. (H. Collett 951, K–holotype of *Lespedeza prainii* Coll. et Hemsl.); Taunggyi, 4500 ft. (F. G. Dickason 9051, A); Maymyo (Khan 200, K); Ukhrul, 6000 ft. (F. Kingdon-Ward 18037, A, BM); Northern Shan states, between Lashio and Namkhan, 2000–3000 ft. (F. Kingdon-Ward 20316, A, BM); Maymyo Plateau, 3500 ft. (J. H. Lace 4999, E, K); Shan States, King Tung, 4000–5500 ft. (R. W. Mactireger 18, E).

THAILAND. Chiang Mai, Doi Chiang Dao, 5000 ft. (L. B. & E. C. Abbe & T. Smitinand 9327, A), loc. cit., 1510–2190 m (H. Koyama & al. T-33268, KYO, TUS), loc. cit., 1900–2100 m (G. Murata & al. 15201, TI), Doi Nom (S. Phusomsaeng 47, TI), Doi Chiang Dao (T. Smitinand & E. C. Abbe 22178, A).

Distribution. China (southern Yunnan and Guangxi), Myanmar (Burma) and Thailand. (Fig. 14f)

8. **Campylotropis cytisoides** Miq., Fl. Ned. Ind. **1**: 229 (1855) [Type: Type of *Lespedeza cytisoides* Benth.]. [Figs. 18B, 19]

[*Phlebosprium cytisoides* Jungh., Reisen Durch Java 346 (1845), nom. nud.].

Lespedeza cytisoides Benth. in Miq., Pl. Jungh. 230 (1852) [Type: Indonesia, Java. F. Junghuhn 717 (K holo.)], non Bertol. (1850); Maxim. in Act. Hort. Petrop. **2**: 348 (1873); Koorders in Natuurk. Tijdschr. Nederl. Ind. **60**: 268 (1901), & Excurs. Fl. Java 392 (1912).

Campylotropis virgata Miq., Fl. Ned. Ind. **1**: 230 (1855) [Type: Indonesia, Java].

Lespedeza junghuhniana Bakh.f. in Blumea **11**: 134 (1961) [Type: Type of *L. cytisoides* Benth.]; Backer & Bakh.f., Fl. Java **1**: 613 (1963).

A shrub, usually 150–300 cm high; young stems with appressed short hairs. Leaves with a distinct rachis; rachis 1–10 mm long. Stipules 5–12 mm long, 0.5–1 mm wide. Petioles 1.5–5.5 cm long, with dense appressed short hairs. Leaflets subcoriaceous, narrowly ovate to elliptic, retuse and mucronulate at the apex, obtuse at the base, upper surface glabrous, lower surface with sparse appressed short hairs; terminal leaflets 2.3–6.5 cm long, 1–2 cm wide. Stipels absent. Inflorescences 4–15 cm long; rachis and pedicels covered with dense ascending short hairs and glandular hairs. Bracts 1.5–2 mm long, caducous before anthesis. Pedicels 2–5 mm long. Bracteoles 0.3–0.8 mm long. Calyx densely ascending short hairy mixed with glandular hairs; tube 1.2–1.4 mm long; lobes narrowly triangular, 1.7–2.1 mm long. Corolla pinkish white; standard elliptic, obtuse at the apex, ca. 8 mm long (including ca. 1.5 mm long claw), ca. 4 mm wide; wings ca. 7.7 mm long (including 2 mm long claw), ca. 2 mm wide; keel-petals ca. 10 mm long (including ca. 2 mm long claw). Androecia ca. 8 mm long, vexillary stamen almost free. Gynoecia ca. 7.2 mm long; ovary ca. 2 mm long; style ca. 5 mm long, appressed short hairy at the basal half. Pods obliquely obovate, obtuse at the apex, ascending short hairy, 6.5–8 mm long, 4.5–8 mm wide. Seeds reniform, redish-brown, 2–2.2 × 3.3–3.8 mm in size.

Distribution. China (southern Yunnan), Indonesia (Java, Bali, Lombok and Timor), Laos, Myanmar (Burma), Thailand and Vietnam. (Fig. 24a)

This species superficially resembles *Campylotropis burmanica* and *C. thomsonii*. See differences between this and *C. burmanica* in the note under the latter. *Campylotropis thomsonii* differs from *C. cytisoides* in having oblong pods with a rounded apex and dense, silky hairs on the lower surface of leaflets.

Campylotropis virgata Miq. was treated by Schindler (1928) as a synonym of *Lespedeza cyrtobotrya* Miq., but we think the name is a synonym of *C. cytisoides*.

Campylotropis cytisoides is distributed

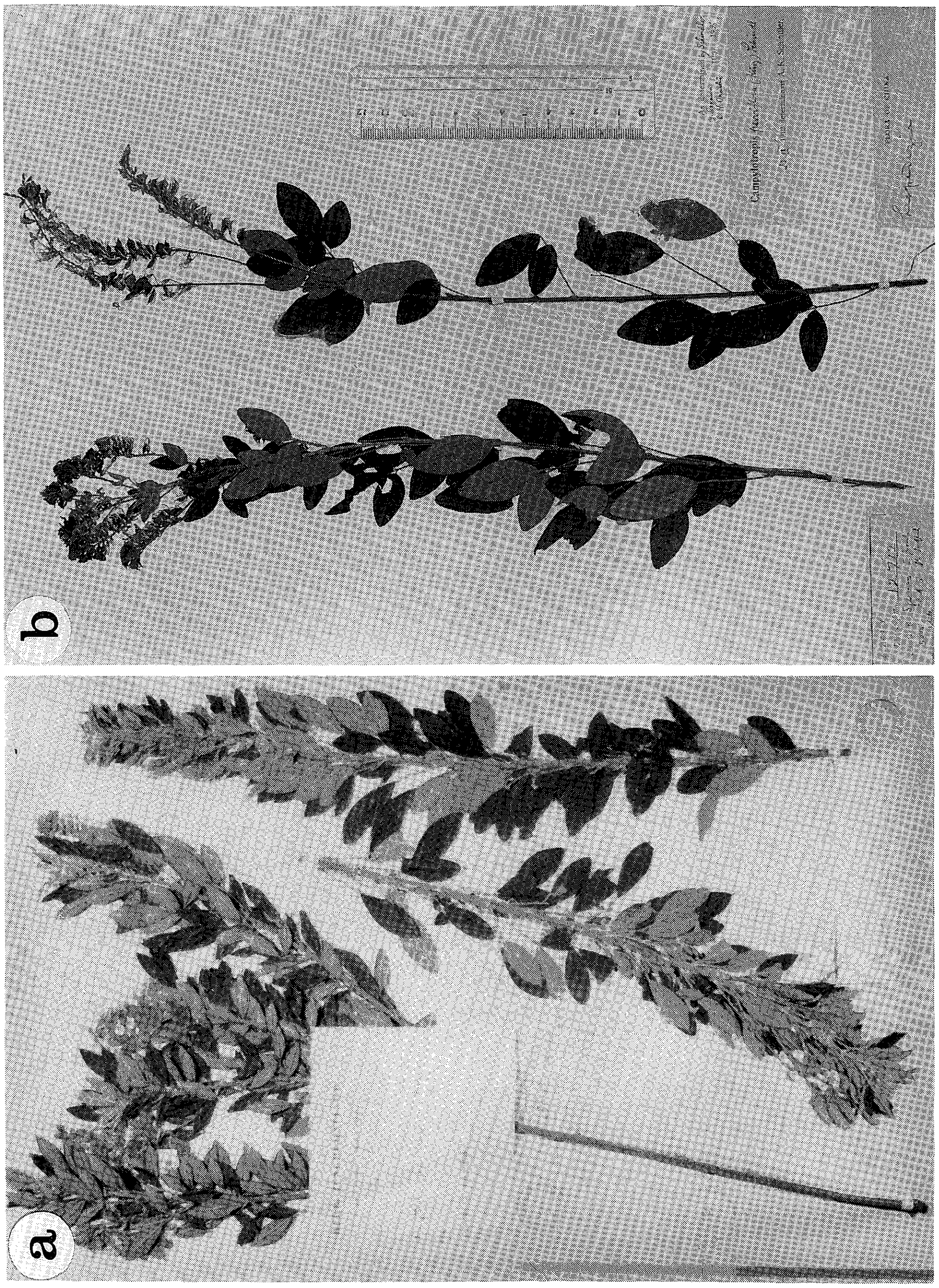

Fig. 19. a: *Campylotropis cytisoides* Miq. f. *cytisoides* (voucher specimen: Junghuhn 717, K). b: *C. cytisoides* Miq. f. *parviflora* (Kurz) Iokawa & H.Ohashi (Henry 12712, A).

disjunctively in continental Asia and Indonesia as shown in Fig. 24a and shows different tendency of morphological variation between both areas. Plants distributed on the continent are always densely grandular hairy on inflorescence rachis, pedicels and calyx, but those of Indonesia are only sparsely glandular hairy on the corresponding organ. Moreover, the continental plants mostly tend to have longer inflorescences and larger leaflets which are thinner in texture than those of Indonesia. We recognized both forms to be distinct: f. *cytisoides* in Indonesia and f. *parviflora* in continental Southeast Asia.

Key to the forms of *C. cytisoides*

1. Inflorescence rachis, pedicels and calyx sparsely glandular-hairy..........f. *cytisoides*
1. Inflorescence rachis, pedicels and calyx densely glandular-hairy..........f. *parviflora*

8-1. *Campylotropis cytisoides* Miq. f. **cytisoides** [Fig. 19a]

Specimens examined: INDONESIA. **Bali**. Mt. Batur, Kintamani, 1100 m (A. Dilmy 1129, BO); Mt. Abang, 1550 m (C. G. G. J. van Steenis 8001, A, BO). **Java**. locality unknown (T. Horsfield L99, GH, K, photo in A; F. Junghuhn 717, K–type of *Lespedeza cytisoides* Benth.); Mt. Arjuna, 2000 m (S. H. Koorders & A. Koorders 43722B, BO); Ngadisari, 2000 m (S. H. Koorders 37649B, BO, K); Tengger (S. H. Koorders 37650B, BO); Mt. Wilis, 3500 m (O. Kuntze 56-8, K); Mt. Pangerayo (E. Nielsen 935, A); Malang, 1500–1900 m (C. G. G. J. van Steenis 11879, BO); Mt. Ardjoeno, 2000 m (C. G. G. J. van Steenis 7012, A); locality unknown (J. E. Teysmann s.n., K); Mt. Ardjoeno, 2000 m (C. de Voogd 804, L); Tengergebergte (Went, L). **Lombok**. Mt. Rinjani, 1300–1500 m (J. Elbert 1687, BO), loc. cit., 1450–1650 m (J. Elbert 1743, BO), loc. cit., 1800–2600 m (R. van der Veen 8, BO), loc. cit., 1600 m (C. N. A. de Voogd 2579, A, BO). **Timor**. Huato-Builico, NW of Mt. Tata, along roadside among grasslands (C. G. G. J.van Steenis 18391, BO, L).

Cultivated in Japan. The Experimental Garden of the Biological Institute, Graduate School of Science, Tohoku University, originated from Indonesia, E. Java, Pasuruan, Tosari Dist., Podokoyo Vil., below Information Office of Bromo-Tengger-Semeru National Park, 1650 m (T. Nemoto 9682201, TUS).

Distribution. Indonesia (Java, Bali, Lombok and Timor). (Fig. 24a)

8-2. *Campylotropis cytisoides* Miq. f. **parviflora** (Kurz) Iokawa & H.Ohashi, **comb. nov.** [Figs. 18B, 19b]

Lespedeza parviflora Kurz in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **42**: 231 (1873) [Type: Myanmar (Burma). Martaban Hills. Revd. F. Mason s.n. (K holo.), n. v.], & in Forest Fl. Brit. Burma **1**: 380 (1877); Baker in Hook.f., Fl. Brit. Ind. **2**: 144 (1876); Coll. & Hemsl. in J. Linn. Soc. Bot. **28**: 45 (1890); Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **66**: 377 (1897); H.Lév., Cat. Pl. Yun-Nan 158 (1916); Gagnep. in Lecomte, Fl. Gén. Indo-China **2**: 522 (1920); Craib, Fl. Siam **1**: 433 (1928).

Campylotropis parviflora (Kurz) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 342 (1912), ut *C. parvifolia*; in Sargent, Pl. Wils. **2**: 115 (1914); C.Y.Wu & al., Index Fl. Yunnan. **1**: 575 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 50 (1987); Thuân in Fl. Camb. Laos Viêt. **23**: 146 (1987); P.Y.Fu in Fl. Reip. Pop. Sin. **41**: 123 (1995).

Specimens examined: CHINA. **Yunnan**. Szemao, 5000 ft. (A. Henry 12712, A, E, MO); Gingtung, Hsiao Chan Chieh, 1150 m (M. K. Li 1442, KUN); Zhenyuan to Enle (C. Y. Wu & al. 82117, KUN).

LAOS. 20 km NE. of Phomsavan, 3 km S of Ban Hang (T. Tuyama L57170, TI); Between Ban Phu Phao and Ban Hang (T. Tuyama L57415, TI); Phongsavanh, Farm of IVE (T. Tuyama L57600, TI).

MYANMAR (BURMA). Maymyo, 3500 ft. (J. H. Lace 6345, E).

THAILAND. Chiang Mai, Doi Suthep, 400–800m (N. Fukuoka T-4458, KYO); Chiang Mai, Me Nya, Me Kang, 915 m (H. B. G. Garrett 103, TI); Chiang Mai, Doi Suthep (C. C. Hosseus 202, E, MO); Chiang Mai, Mae Tamang, 1200–1300m (H. Koyama & al. T-31317, T-31359, KYO); Phetchabun, Nam Nao, Nam Nao National Park, 850 m (H. Koyama & al. T-31666, KYO), loc. cit., 800–900 m (H. Koyama & al. T-31763, KYO), loc. cit., 900 m (H. Koyama & al. T-31860, KYO); Chiang Mai, Mae Tamang, Mae Cham, Mae Pan Waterfall, 1110 m (H. Koyama & al. T-32097, T-32131, KYO), loc. cit., 1500 m (H. Koyama & al. T-39663, A, KYO); NE of Khon Kaen, Phu

Khieo, 850 m (H. Koyama & al. T-41784, KYO); Chiang Mai, Doi Suthep, 700–800 m (J. F. Maxwell 90-47, MO); Nae Soi Valley, 1475 m (J. F. Maxwell 91–22, MO); Chiang Mai, Doi Chiang Dao, 900 m (J. F. Maxwell 91–81, MO); Chiang Mai, Doi Suthep, 250–800 m (H. Ogawa & K. Yoda 212-6, TI), loc. cit., 1100 m (Royal Forest Dep. 4518, A); Chiang Mai, Baw Luang (R. Saughhachand 181, TI); Phu Kradung National Park, 1190–1250 m (T. Shimizu & al. T-23162, KYO); Chiang Mai, Doi Suthep, Pah Hom Pok, 1200 m (T. Sorensen & al. 1630, A); Loei. Phu Kradung, 1100–1200 m (M. Tagawa & al. T-534, KYO); Chiang Mai, Ban Yang, Doi Inthanon, 600–1350 m (M. Tagawa & al. T-2463, KYO, TI); Doi Chiang Dao, (T. Tuyama T57341, TI); Kanchanaburi, Pilog Thong Pha Phum (C. Chermsirivathana 1587, TI).

Cultivated in Japan. The Experimental Garden of the Biological Institute, Graduate School of Science, Tohoku University, originated from Thailand, Doi Suthep, collected by Y. Tateishi & T. Kurosawa (Y. Iokawa 5390, TUS).

Distribution. China (southern Yunnan), Laos, Myanmar (Burma), Thailand and Vietnam. (Fig. 24a)

9. **Campylotropis decora** (Kurz) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 428 (1912). [Figs. 20a, 21A]

Lespedeza decora Kurz in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **42**: 231 (1873) [Type: Myanmar (Burma). Martaban. Kurz (K holo.), n. v.], & in Forest Fl. Brit. Burma **1**: 381 (1877); Baker in Hook.f., Fl. Brit. Ind. **2**: 144 (1876); Coll. & Hemsl. in J. Linn. Soc. Bot. **28**: 45 (1890); Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **66**: 377 (1897).

Lespedeza sericophylla Coll. & Hemsl. in J. Linn. Soc. Bot. **28**: 45 (1890) [Type: Myanmar (Burma). Shan hills, Toungyi, 5000 ft. H. Collett 13 (K holo.)]; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **66**: 374 (1897), **syn. nov.**

Campylotropis sericophylla (Coll. & Hemsl.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 429 (1912), **syn. nov.**

Campylotropis *sessilifolia* Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 427 (1912) [Type: Myanmar (Burma). South Shan hills, Toungyi, 1200 m. Robertson 54 (K holo.)], **syn. nov.**

Lespedeza henryi auct. non Schindl.: Gagnep. in Lecomte, Fl. Gén. Indoch. **2**: 520 (1920), ut *L. henryi* (Schindl.) Gagnep.; Craib., Fl. Siam. **1**: 433 (1928).

Campylotropis henryi auct. non (Schindl.) Schindl.: Thuân in Fl. Camb. Laos Viêt. **23**: 144 (1987).

A shrub, usually 100–150 cm high; young stems with dense ascending or patent hairs. Leaves with a distinct rachis; rachis 2–6 mm long. Stipules 3.5–6.5 mm long, 1–1.8 mm wide. Petioles 0.5–3.5 cm long, densely ascending hairy. Leaflets subcoriaceous, obovate to elliptic, retuse and mucronulate at the apex, obtuse at the base, upper surface glabrous or pubescent, lower surface densely appressed or ascending hairy; terminal leaflets 2–5 cm long, 1–3.5 cm wide. Stipels absent. Inflorescences 2–9 cm long; rachis and pedicels with ascending or patent short hairs and dense glandular hairs. Bracts 1–2 mm long. Pedicels 4–10 mm long. Bracteoles 1–1.5 mm long. Calyx with appressed or ascending short hairs mixed with glandular hairs; tube 1.5–2.5 mm long; lobes narrowly triangular, 3–4 mm. Corolla purplish blue; standard elliptic, obtuse at the apex, ca. 10 mm long (including ca. 1.5 mm long claw), ca. 6 mm wide; wings ca. 9 mm long (including ca. 3 mm long claw), ca. 3.5 mm wide; keel-petals ca. 14 mm long (including ca. 3 mm long claw). Androecia ca. 11 mm long, vexillary stamen connate to staminal tube for about one-fourth of its length. Gynoecia ca. 12 mm long; ovary ca. 2 mm long; style ca. 9.5 mm long. Pods obliquely ovate or obovate, obtuse at the apex, ascending short hairy, 6–7 mm long, 4–4.5 mm wide. Seeds reniform, purplish-brown, ca. 2 × 3.5 mm in size.

Specimens examined: CHINA. **Yunnan**. Xishuangbanna, Menghan to Jinha, 540 m (K. M. Feng 20755, KUN).

LAOS. Pak Lay (Spire 1478bis, P); Louang

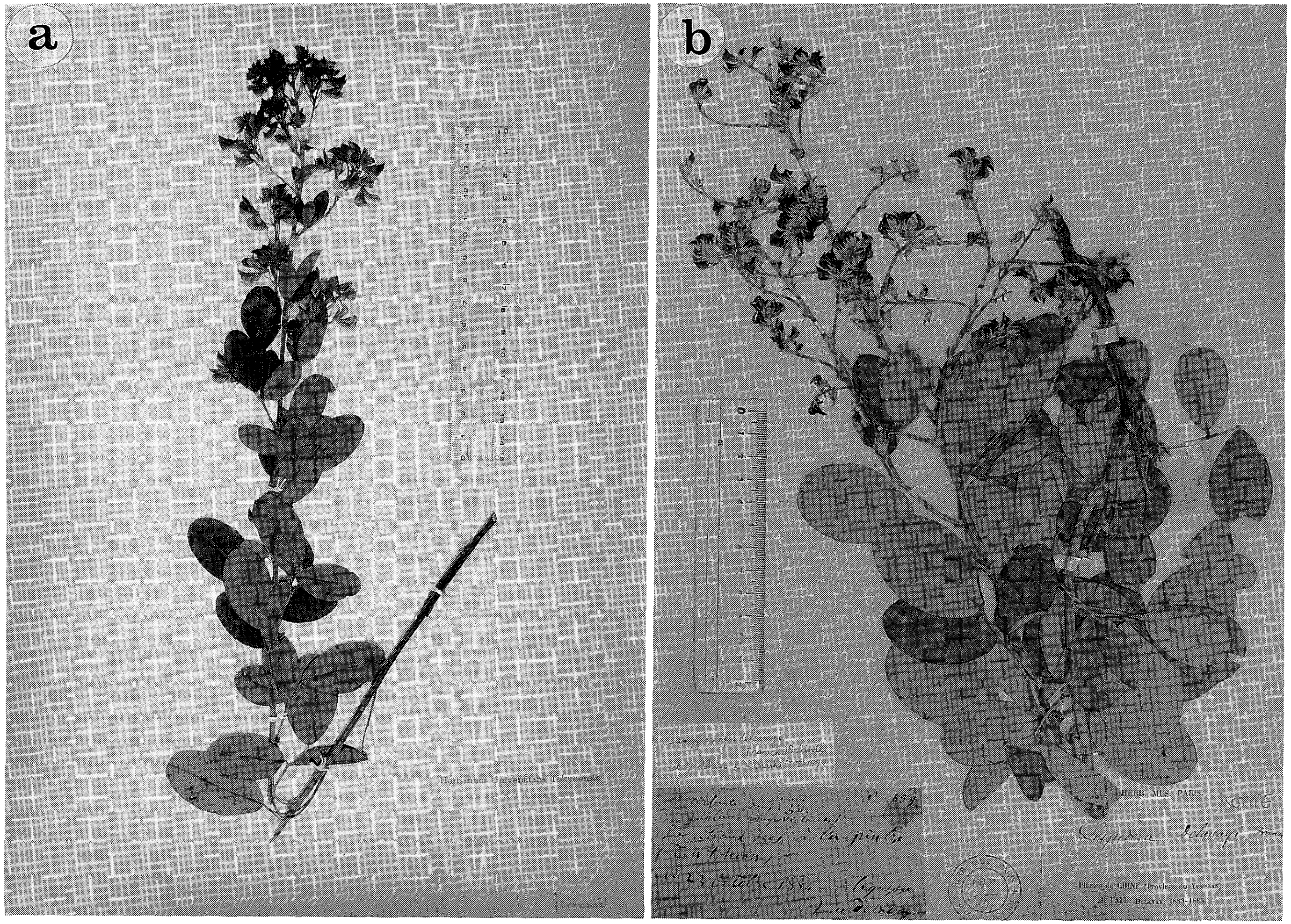

Fig. 20.　a: *Campylotropis decora* (Kurz) Schindl. (voucher specimen: Kanai, Jan. 13, 1964, TI). b: *C. delavayi* (Franch.) Schindl. (Delavay 659, P).

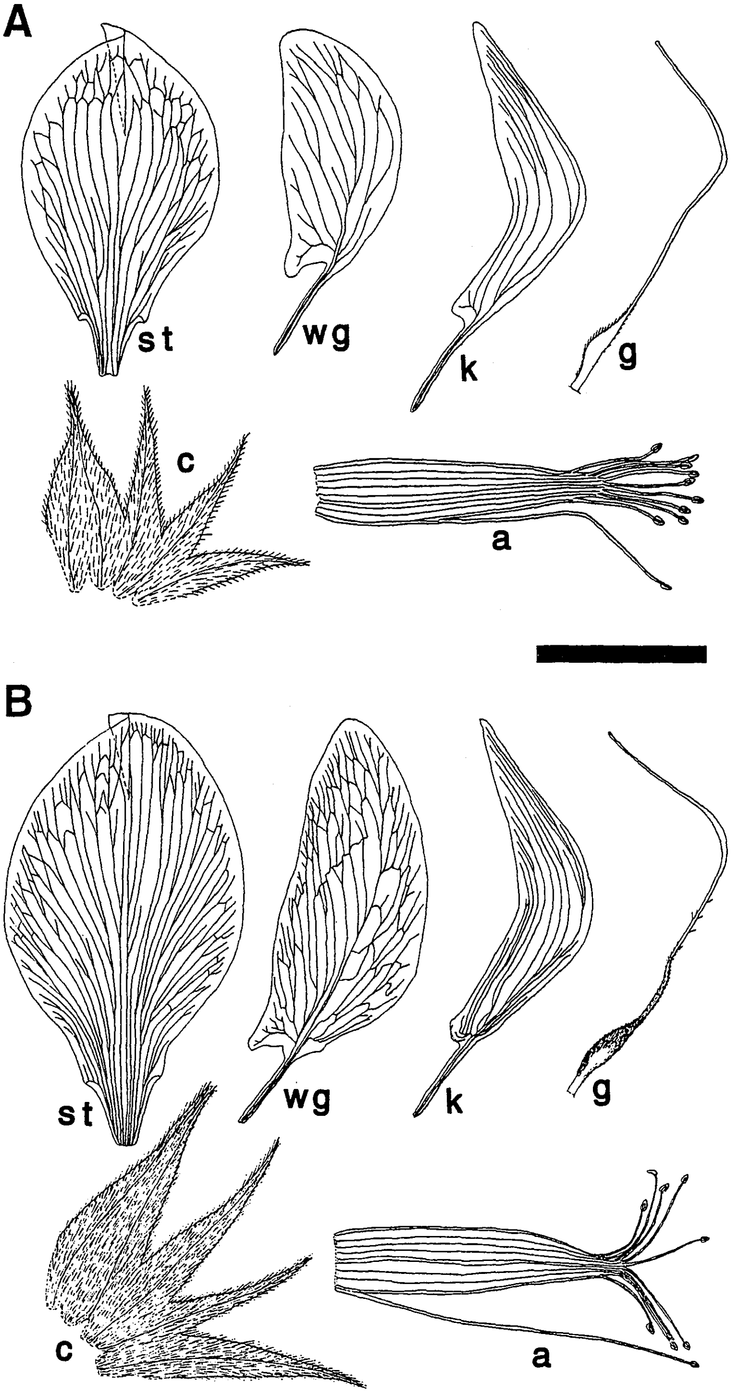

Fig. 21. Flowers of *Campylotropis decora* (A. voucher specimen: Watt 10722, E) and *C. delavayi* (B. Forrest 15474, E). a: androecium, c: calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

Phrabang (Spire 1493, P); Pak Lay to Louang Prabang (Thorel s.n., anno 1866–68, P).

MYANMAR (BURMA). Shan hills, Toungyi, 5000 ft. (H. Collett 13, K–holotype of *Lespedeza sericophylla* Coll. & Hemsl.); Kalau (F. G. Dickason 1088, A); Mandalay to Maymyo, 500–1000 m (H. Kanai, Jan.13,1964, TI); Maymyo, Gubasc hills, near Purdaung, 3500 ft. (J. H. Lace 5880, E, K); South Shan hills, Toungyi, 1200 m (Robertson 54, K–holotype of *C. sessilifolia* Schindl.); SE Shan States, Saon to Mongpaou, 4500 ft. (G. Watt 10722, E).

THAILAND. Doi Chiang Dao, Hui Nang Lao drainage, ca. 1540 m (Garrett 1158, K); locality unknown (Kerr 2862, 4635, K); Gokbeik Shanb, 2000 ft. (Meebold 8009, E); Doi Chiang Dao (Put 4484, K); Chang Mai, N.slope of Mt. Chiang Dao (T. Sorensen & al. 1243, A); Doi Chiang Dao, ca. 1100 m (T. Smitinand 4211, TI), loc. cit., 1900 m (T. Smitinand 4252, A).

Distribution. China (southern Yunnan), Laos, Myanmar (Burma) and Thailand. (Fig. 24b)

This species is similar to *Campylotropis henryi*, but the latter differs in having a winged petiole with a slightly convex ventral side and tetra-angular young branches.

10. **Campylotropis delavayi** (Franch.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 426 (1912), & in Hand.-Mazz., Symb. Sin. **7**: 573 (1933); Fl. Illust. Pl. Prim. Sin. 536, fig. 530 (1955); Icon. Cormophyt. Sin. **2**: 465, fig. 2660 (1972); C.Y.Wu & al., Index Fl. Yunnan. **1**: 573 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 29 (1987), & in Fl. Reip. Pop. Sin. **41**: 100 (1995). [Figs. 20b, 21B]

Lespedeza delavayi Franch., Pl. Delavay. 165 (1890) [Type: China. Yunnan. Dapingzi as “in collibus siccis propre Tapin-tze”. Delavay 659 (P holo.; A iso., holo-photo.)], & in Rev. Hort. 225, fig. 70 (1890); H. Lév., Cat. Pl. Yun-Nan 157 (1916).

Lespedeza atrokermesina G.Forrest ex W.W.Smith in Not. Bot. Gard. Edinb. **10**: 44 (1917) [Type: China. Yunnan. Mekong-Yangtze divide, 9000 ft. G. Forrest 13410 (E holo.)].

A shrub, usually 100–300 cm high; young stems with dense appressed whitish sericeous hairs. Leaves with a distinct rachis; rachis 2–17 mm long. Stipules 3–5 mm long, 1–1.2 mm wide. Petioles 1–3 cm long, densely appressed whitish sericeous. Leaflets coriaceous, obovate to oblong, retuse and mucronulate at the apex, obtuse or rounded at the base, upper surface glabrous, lower surface covered with dense appressed whitish sericeous hairs; terminal leaflets 1.5–7 cm long, 1.3–5.7 cm wide. Stipels absent. Inflorescences subdensely flowered, 2–11 cm long, often paniculate; rachis and pedicels with dense patent whitish short hairs and glandular hairs. Bracts 1.5–3 (–4) mm long. Pedicels 2–4 mm long. Bracteoles 1–2 mm long. Calyx with dense appressed whitish sericeous hairs and sparse glandular hairs; tube 1.6–2.5 mm long; lobes narrowly triangular, 4.3–5.5 mm long. Corolla dark purple; standard elliptic, obtuse at the apex, 10–13 mm long (including ca. 1.7 mm long claw), ca. 7 mm wide; wings ca. 12.5 mm long (including ca. 2.5 mm long claw), ca. 4.3 mm wide; keel-petals ca. 14.5 mm long (including ca. 2.5 mm long claw). Androecia ca. 10.5 mm long, vexillary stamen connate to the tube at the base. Gynoecia ca. 13.5 mm long; ovary 2.2–2.5 mm long; style 10–10.5 mm long. Pods obliquely elliptic, obtuse at the apex, appressed short hairy, 6–7 mm long, ca. 5 mm wide. Seeds reniform, purplish-brown, ca. 1.7 × 2.7 mm in size.

Specimens examined: CHINA. **Sichuan**. Hweili Xian (W. P. Fang 93126, A, E, K); locality unknown (Handel-Mazzetti 5610, K); Muli Xian, 8000–10000 ft. (G. Forrest 16978, E), loc. cit., 8000–9000 ft. (G. Forrest 22957, E, K; G. Forrest 32957, A); Nanchuan Xian (T. N. Liou 21522, KUN); Muli Xian, 1600 m (Qinghai-Xizang Exped. 14879, KUN). **Yunnan**. Binchuan Xian, Dapingzi (Delavay 659, A–isotype and photo of holotype of *Lespedeza delavayi* Franch., K, LE, P–isotype); Noachang, Kieou Ya Pin (F. Ducloux 5967, E); Mekong-Yangtze divide, 9000 ft. (G. Forrest 13410, E–holotype of *C. atrokermesina* G.Forrest ex W.W.Smith; K–isotype); Dali Xian, 10000 ft. (G. Forrest 15474, E, K); Mu-li mountain, 8–10000 ft (G.Forrest 16978, E, K); W Yunnan (G. Forrest 28551, E, MO, TI); locality unknown, 400 m (E. E. Maire 373, E); Lijiang to Yongning, 2150 m (J. F. Rock 17348, A, E, K); Pe Yen Tsin (P. S. Ten 3, A, E).

Distribution. China (Sichuan and Yunnan). (Fig. 24c)

This species is readily identified by the combination of dense, whitish, silky hairs on the whole plant, except the upper surface of the leaflets and panicle-like inflorescences with many dark purple flowers. The flower color is stable and conspicuous even in herbarium specimens.

11. **Campylotropis diversifolia** (Hemsl.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 342 (1912), & in Sargent, Pl. Wils. **2**: 115 (1914); C.Y.Wu & al., Index Fl. Yunnan. **1**: 573 (1984); P.Y.Fu in Bull. Bot. Res., Harbin **7**(4): 29 (1987), & in Fl. Reip. Pop. Sin. **41**: 102 (1995). [Figs. 22a, 23A]

Lespedeza diversifolia Hemsl. in Hook. Icon. Pl. tab. 2625 (1899) [Type: China. Yunnan. Mengze, 6000 ft. A. Henry 9243 (K holo.)]; H.Lév., Cat. Pl. Yun-Nan 157 (1916).

A shrub, usually 100–200 cm high; young stems with sparse appressed short hairs. Leaves dimorphous; lower leaves petiolate, with obovate leaflets and distinct rachis, rachis 4–8 mm long; upper leaves subsessile, with deltoid leaflets and a minute rachis, rachis 0.5–4 mm long. Stipules 1.5–2 mm long, 0.5–1 mm wide. Petioles of lower leaves 0.5–1.2 cm long, sparsely appressed short hairy. Leaflets chartaceous, obtuse and mucronulate at the apex and obtuse at the base on the lower leaves, acuminate at the apex and cordate or truncate at the base on the upper leaves, upper surface glabrous or sparsely short hairy, lower surface with sparse appressed short hairs; terminal leaflets 2–3.5 cm long, 1.2–2.8 cm wide on the lower leaves, 1.5–3 cm long, 1.8–3 cm wide on the upper leaves. Stipels absent. Inflorescences 2–5 cm long, often paniculate. Bracts ca. 1 mm long. Pedicels 5–9 mm long, appressed short hairy and also with sparse glandular hairs. Bracteoles 0.3–1 mm long. Calyx with dense appressed short hairs, rarely also with glandular hairs; tube 2–2.5 mm long; lobes narrowly triangular, 2–3 mm long. Corolla purple; standard elliptic, obtuse at the apex, 12–14 mm long (including ca. 1.5 mm long claw), 6–8 mm wide; wings 12–13 mm long (including ca. 3 mm long claw), 3.5–4 mm wide; keel-petals 16–18 mm long (including ca. 3 mm long claw). Androecia 13–14 mm long, vexillary stamen connate to staminal tube for about one-fourth of its length. Gynoecia ca. 15 mm long; ovary ca. 3 mm long; style ca. 11.5 mm long. Pods obliquely elliptic, obtuse at the apex, appressed short hairy, 9–10 mm long, ca. 5 mm wide. Seeds reniform, brown, ca. 2.5 × 3.6 mm in size.

Specimens examined: CHINA. **Yunnan**. Mengzi Xian, 6000 ft. (A. Henry 9243, K–holotype of *Lespedeza diversifolia* Hemsl.), loc. cit., 5000 ft. (A. Henry 9243A, A, E, LE, MO), loc. cit. (A. Henry 9243B, A, E, LE, MO); Yuanjiang, 800 m (Y. H. Li 5983, KUN); Yanshan Xian, 1600 m (H. T. Tsai 58-9113, KUN); Shiping Xian, 1200–1700 m (S. K. Wu 879, KUN); Yuanjiang, 1050–1600 m (Y. Q. Yin 1968, KUN).

Distribution. China (Yunnan). (Fig. 24d)

This species is quite distinct in the genus in having strongly dimorphic leaves. *Campylotropis harmsii* also shows dimorphic leaves, but the degree of difference is less between upper and lower leaves. The inflorescence of *C. diversifolia* somewhat resembles that of *C. capillipes, C. harmsii* and *C. pauciflora* especially in the slender pedicels.

12. **Campylotropis falconeri** (Prain) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 424 (1912). [Figs. 22b, 23B]

Lespedeza macrostyla (D.Don) Baker ex Maxim. in Act. Hort. Petrop. **2**: 348 (1873), p. min. p., quoad specim. cit. Falconer no. 443, cet. excl.

Lespedeza eriocarpa DC. var. *falconeri* Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat.

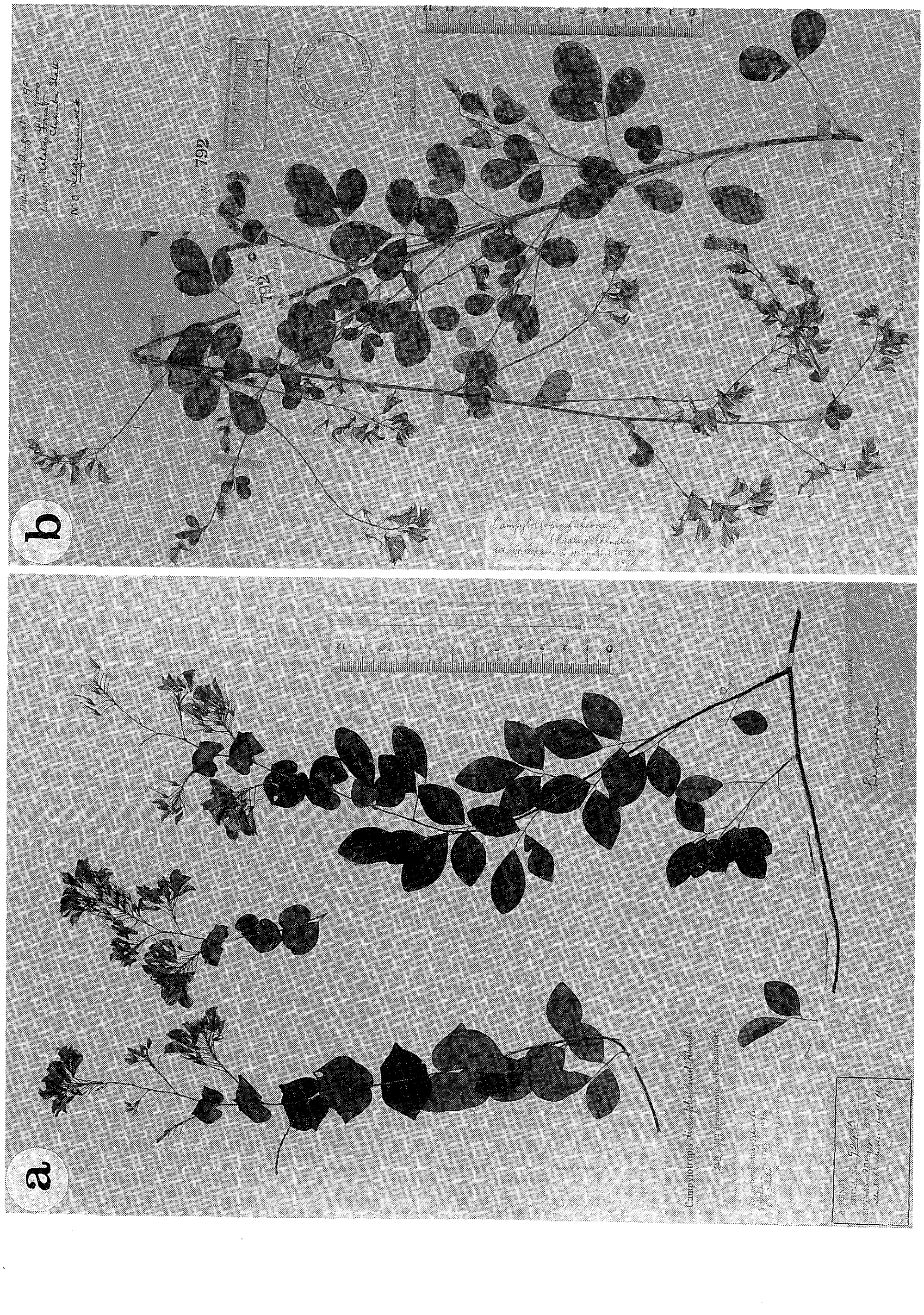

Fig. 22. a: *Campylotropis diversifolia* (Hemsl.) Schindl. (voucher specimen: Henry 9243A, A). b: *C. falconeri* (Prain) Schindl. (Lace 792, E).

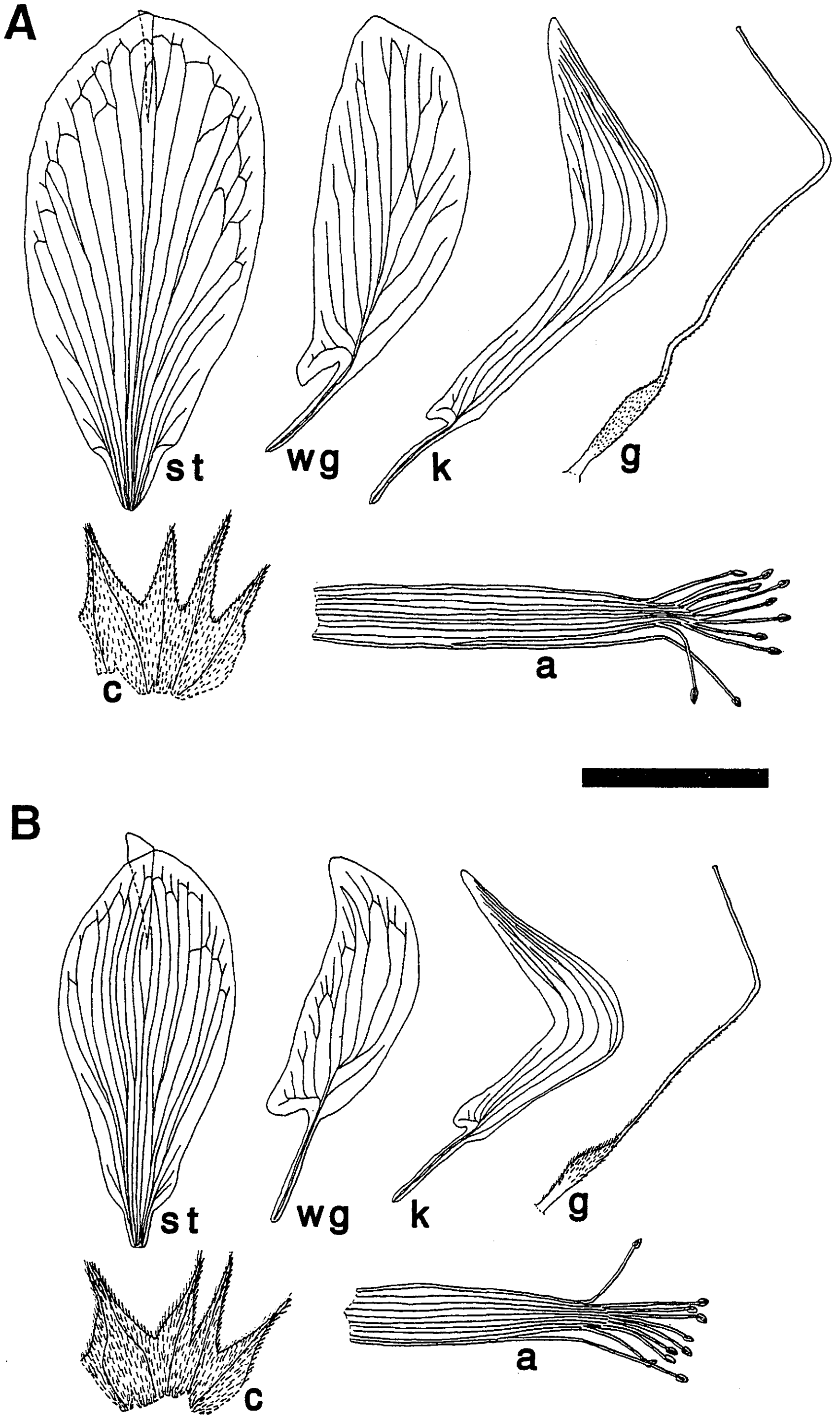

Fig. 23. Flowers of *Campylotropis diversifolia* (A. voucher specimen: Li 05983, KUN) and *C. falconeri* (B. Gamble 4968A, K). a: androecium, c: calyx opened (outer surface), upper lobe in left, g: gynoecium, k: keel-petal, st: standard, wg: wing. Scale bar = 5 mm.

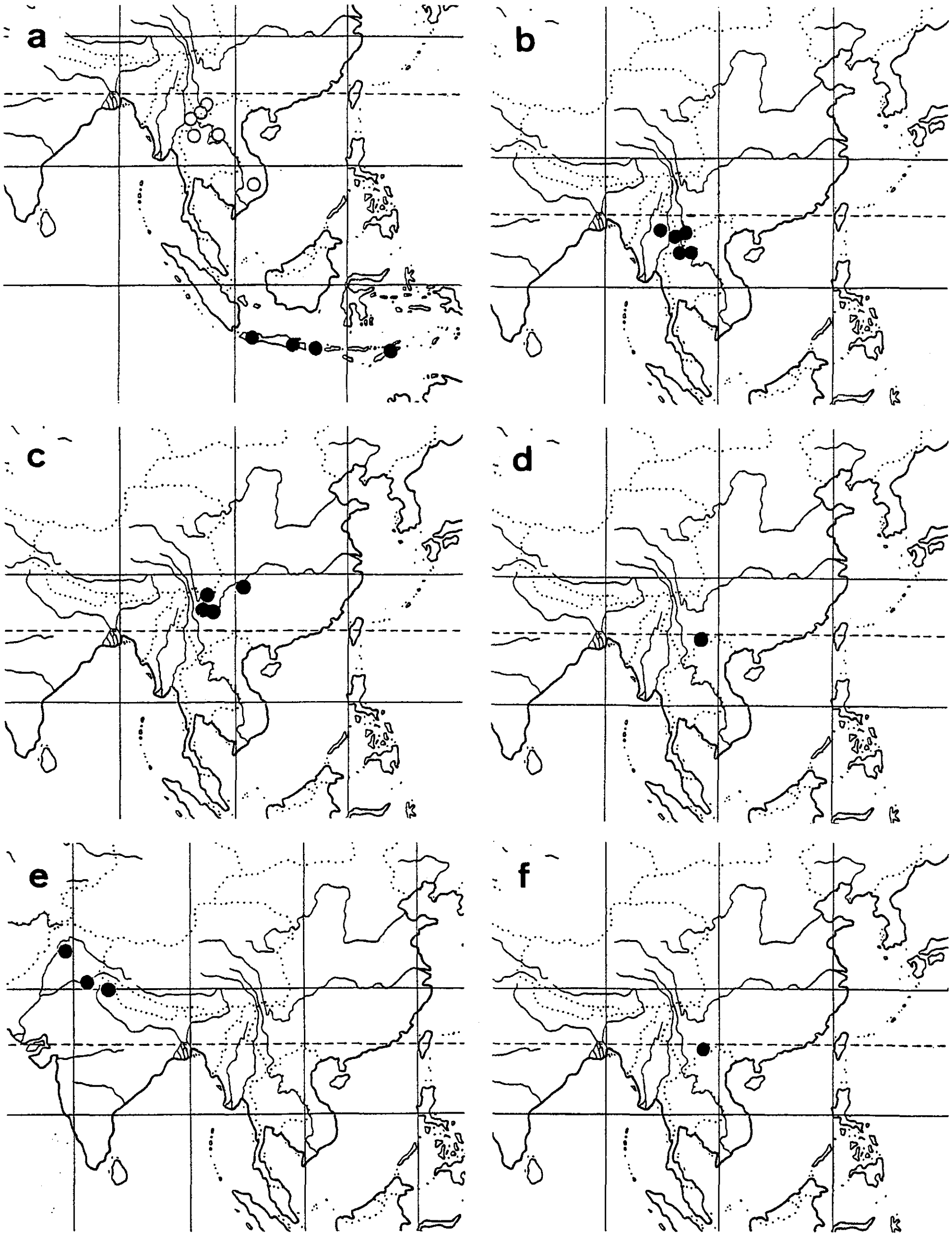

Fig. 24. Distribution of *Campylotropis* (II). a: *C. cytisoides* (●: f. *cytisoides*, ○: f. *parviflora*), b: *C. decora*, c: *C. delavayi*, d: *C. diversifolia*, e: *C. falconeri*, f: *C. fulva*.

Hist. **66**: 376 (1897) [Type: India, Gurhwal. Falconer 443 (K syn.; CAL, GH, L, LE isosyn.); Simla. Elysium Hill. Gamble 4968 (K syn.)].

Lespedeza dubia Schindl. in Repert. Spec. Nov. Regni. Veg. **9**: 514 (1911) [Type: India. Gurwhal. Falconer 443 (LE holo.; CAL, GH, K, L iso.)].

Lespedeza meeboldii Schindl. in Repert. Spec. Nov. Regni. Veg. **9**: 521 (1911) [Type: Pakistan. Murree, 2100 m. Meebold 1468 (B holo.; K iso.)].

Campylotropis drummondii Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 452 (1912) [Type: India. Panjab. Ad clivos africos c. 5000' s. m. inter Dalhousie et Chamba. Drummond 1502 (K holo.)]; H.B.Naithani, Flow. Pl. India Nepal Butan 108 (1990), **syn. nov.**

Campylotropis meeboldii (Schindl.) Schindl. in Repert. Spec. Nov. Regni. Veg. **11**: 424 (1912); Ali in Biologia **12**: 44 (1966).

Campylotropis eriocarpa Schindl. var. *falconeri* (Prain) N.C.Nair in Fl. Bashahr Himal. 73 (1977); Pramanik & Thothathri in Taxon **33**: 318 (1984).

A shrublet or shrub, usually 100–150 cm high; young stems appressed or patent pubescent. Leaves with a distinct rachis; rachis 1.5–10 mm long. Stipules 3–7 mm long, 0.8–1 mm wide. Petioles 0.3–3.5 cm long, appressed short hairy. Leaflets subcoriaceous, obovate to oblong, retuse and mucronulate at the apex, obtuse or rounded at the base, upper surface glabrous, lower surface sparsely appressed short hairy; terminal leaflets 1–4 cm long, 0.8–3 cm wide. Stipels absent. Inflorescences 2–15 cm long, often paniculate; rachis with ascending or patent short hairs and glandular hairs. Bracts 1.5–3 mm long. Pedicels 4–8.5 mm long, ascending or patent short hairy mixed with glandular hairs. Bracteoles 1–2 mm long. Calyx covered in dense appressed short hairs and sparse glandular hairs; tube ca. 2 mm long; lobes narrowly triangular, ca. 2.5 mm long. Corolla purplish blue; standard elliptic, obtuse at the apex, ca. 11 mm long (including ca. 1.2 mm long claw), ca. 5 mm wide; wings ca. 10 mm long (including ca. 3 mm long claw), ca. 3 mm wide; keel-petals ca. 14.8 mm long (including ca. 3 mm long claw). Androecia ca. 10.5 mm long, vexillary stamen connate to staminal tube for about one-fourth of its length. Gynoecia ca. 11 mm long; ovary ca. 1.8 mm long; style ca. 9 mm long. Pods obliquely elliptic, obtuse at the apex, ascending short hairy, 9–11 mm long, 3.7–4.5 mm wide.

Specimens examined: INDIA. Panjab, Ad clivos africos c. 5000' s. m. inter Dalhousie et Chamba. (Drummond 1502 K–holotype of *C. drummondii* Schindl.); Gurhwal (Falconer 443, GH–isosyntype of *Lespedeza eriocarpa* var. *falconeri* Prain); Shimla, 6500 ft. (J. S. Gamble 4968, K–syntype of *Lespedeza eriocarpa* var. *falconeri* Prain); Chamba State, Between Rakh and Chitrari, 4000–6000 ft. (G. A. Gammie 18571A, K), Kalatop, 7000 ft. (J. H. Lace 792, E); Chamba State (R. N. Parker s.n., A), Ravi valley (R. N. Parker s.n., A); Kashmir (Royle s.n., K); Shalai, 8000 ft. (G. Watt 9590, E); Shimla, 7500 ft. (G. Watt s.n., E).

PAKISTAN. Hazara, Ayubia, ca.8000 ft. (M. N. Chaudhri & al. 240, A), Murree Hills (A. Fleming 296, E; A. Fleming 326, K), loc. cit., 7000 ft. (Meebold 1468, K–isotype of *Lespedeza meeboldii* Schindl.), Murree Hills, Changla Gali (R. R. Stewart 3924, A), Murree Hills (R. R. Stewart 7696, A), Dunga Gali, 7000–8000 ft. (R. R. Stewart 23616, K), Changla to Dunga Gali, 7000–8000 ft. (R. R. Stewart 23617, A, K); NWIndia (J. L. Stewart s.n., E). North Western Himalayas (G. Watt s.n., E).

Himalayas. Jaunsar, Mohua rocks, 7500 ft. (J. S. Gamble 26925, K), Moila, 8500 ft. (J. S. Gamble 26962, K).

Distribution. India (Uttar Pradesh and Himachal Pradesh) and Pakistan (Punjab, Hazara and Kashmir). (Fig. 24e)

This species has often been misidentified as *Campylotropis speciosa* or as *C. eriocarpa*. Ohashi (1974c) merged *C. falconeri* and *C. eriocarpa* under *C. speciosa*. Pramanik and Thothathri (1984) accepted them as distinct taxa but regarded *C. falconeri* as a variety of *C. eriocarpa*.

However, in the present study, glandular hairs were found on the calyx, pedicel and main inflorescence axis of *C. falconeri*, while not in the other two taxa. *Campylotropis falconeri* is also distinguishable from the other two by the large panicle-like inflorescences. We, therefore, treat *C. falconeri* as a distinct species and *C. eriocarpa* as a subspecies of *C. speciosa*.

五百川 裕[a]，大橋広好[b]：**マメ科ハナハギ属の分類学的研究 I**

ハナハギ属はマメ科マメ亜科のヌスビトハギ連ハギ亜連に分類されており，ハギ属に形態的に最も類似するが，竜骨弁が鎌状に内曲して鋭頭となり，花序の1節には1花のみをつけること等の特徴で明瞭に区別される．ハナハギ属は台湾やジャワ島の高所を含めてヒマラヤから東南アジア，中国，朝鮮にかけてアジア温帯域に広く分布しているが，特に中国西南部の雲南省に多い．これまでに78種1亜種7変種4品種が記載されているが，属内の各分類群の異同については，地域的な研究はあっても全体にわたる検討がなされておらず，基礎となる分類学的研究ができていない状態である．そこで本研究では，これまでに記載されている全ての分類群を対象として栄養器官および花と果実の形態についての比較観察を行い，ハナハギ属全体の種類について分類学的検討を行った．その結果，新たに11個の新名（7個の新組合せと4個の新ランク名）を提案して，全体を37種7亜種2変種3品種に整理し，識別形質を検索表にまとめた．また，29分類群はシノニムとした．各分類群について，正名，シノニム，それらの出典と文献をあげ，学名のタイプを併記した．分類群ごとに形態的特徴，花の図解，さらに，調査標本のリストを示し，分布図を作成した．これはその第一部で，序論，形態形質，染色体数，花粉形態の記載，種への検索表，および分類群ごとの解説のうち12種について取り扱った．ここでは，2つの新組合せを提唱した．

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